Chemical Age

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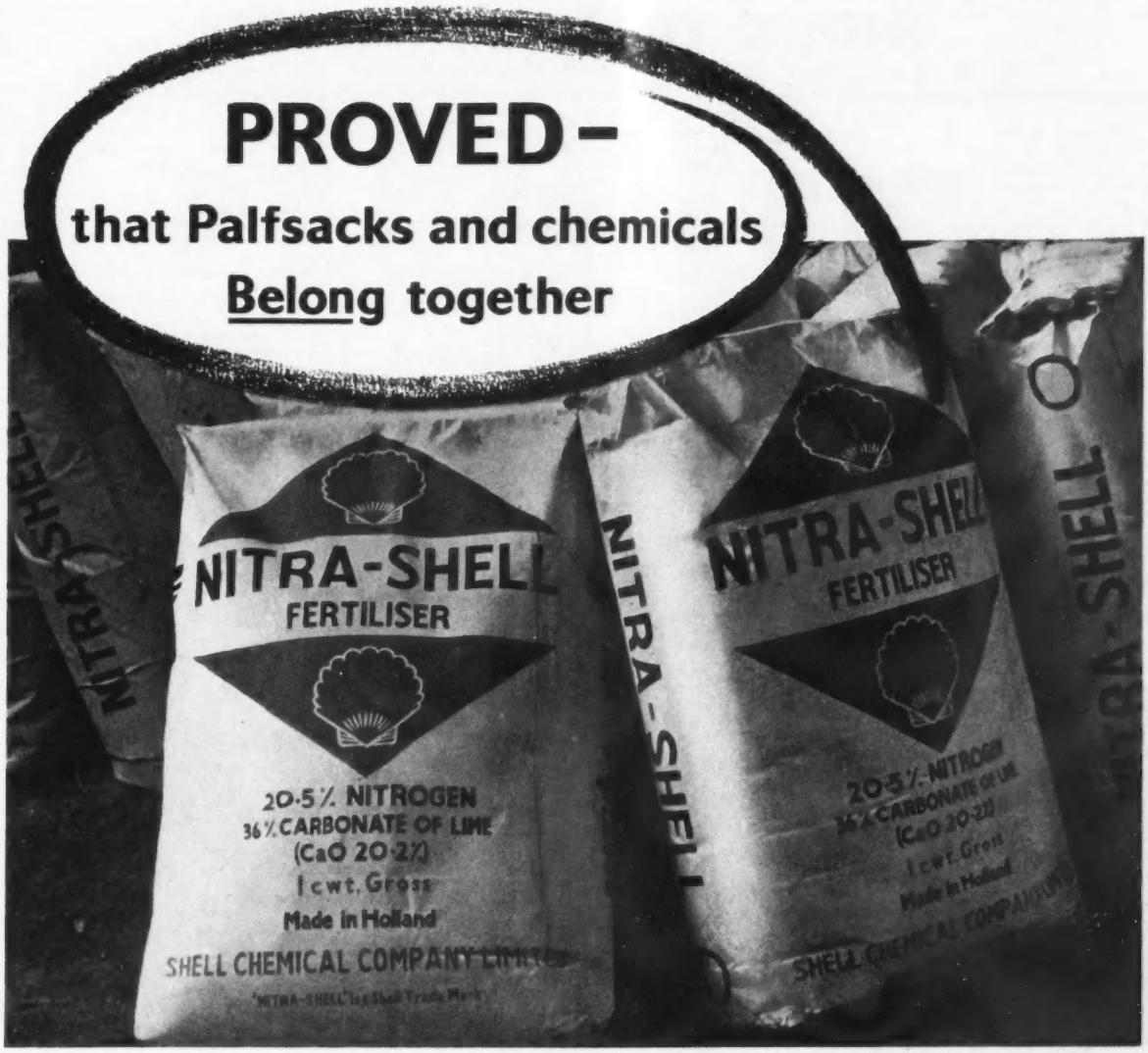

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CHEMICAL AGE

BOUVERIE HOUSE · 154 FLEET STREET · LONDON · EC4

TECHNICAL EDUCATION

DURING the past 18 months the number of students taking the new Diploma in Technology has increased more than two-and-a-half times. This considerable progress is recorded in the second annual report of the National Council for Technological Awards.

Lord Hives, chairman of the council, says that 2,518 students are now following 66 courses leading to the Diploma at 20 colleges as compared with 965 students following 37 courses at 11 colleges in November 1957. He adds that 21 more courses have been recognised.

Since the council was set up by the Minister of Education, just over three years ago, the first diplomas have been awarded and soon several hundred diplomates will be taking their place in industry each year. It is the efforts of the technical colleges and industrial organisations that have made this rapid and striking development possible. In particular, it is noted that 82% of students following the sandwich courses have their fees paid by their employers.

Of the total of 2,518 present students, 1,863 are reading engineering and 655 reading other technologies. In fact, there are now eight times as many engineering students in their first year as there are in the fourth and final year; there are more than 10 times as many in the first year as in the fourth in the "other technologies" group. But it is also clear, the report reveals, that the rate of growth is flattening off. Last year, for the first time, the students did not double their numbers, and the question now arises of how soon will the diploma in technology scheme have reached its limits. Levelling off has occurred in the electrical and mechanical and production engineering. There are still only single courses in existence for applied biology, applied biochemistry, applied pharmacology, instrument and control engineering, and together these courses can find only 52 students. It appears that in some courses, such as biology, for example, it is proving extremely difficult to find companies willing to give the practical training that is an essential part of a diploma in technology course.

Although the technical colleges themselves ensure that the standard of industrial training matches that of academic study, the council must also be satisfied that each student following a course leading to the Diploma is undergoing proper planned industrial training. The nucleus of an industrial training panel is now considering how best this end might be achieved in collaboration with the colleges.

The council have also outlined plans, it will be recalled, for an award higher than a Diploma in Technology. Mr. G. H. Moore, principal, College of Technology, Bristol, speaking at the discussion on 'Developments in Education in Chemistry' following the 81st annual general meeting of the Royal Institute of Chemistry last week (see p. 727), regards the Diploma in Technology courses as providing a long overdue opportunity for original planning on the part of our academic staffs in close collaboration with their industrial colleagues. "With educational freedom provided by internal examinations and with closely integrated industrial experience interspersed in the college course it is difficult to visualise a more effective method of educating our future industrial chemists."

One point made by Mr. Moore is well worth noting. Industrial support, he remarks, means careful planning of the work to be done and providing in the later years opportunities for original thinking and for acquiring "that sense of responsibility which is the hallmark of the professional chemist". A less rigid pattern of examination and a greater measure of concentration on the presentation of fundamental concepts is suggested. "This should produce a chemist with a greater potentiality for adaptation to the changing demand of the future."

In his presidential address to the Institution of Chemical Engineers, Sir Hugh Beaver (see page. 729) discussing the education of the chemical engineer, says that academic and industrial approach are seen to be upon very similar lines—the foundation to be broad, the practical initiation to be general and wide and specialisation to follow thereafter. But he feels that some students should specialise as rapidly as possible Sir Hugh, like Mr. Moore, is concerned with work training and adequate research. Work training he sees as needing to be scientific and methodical, carefully thought out and systematically applied. Also the system of education while avoiding the specialisation of the Continent should produce a sufficient proportion of research students.

If, as Sir Hugh suggests, sponsored research is now well under way in this country, it should materially assist in providing the "closely integrated industrial experience interspersed in the college course" as visualised by Mr. Moore.

Expansions in our universities and technical colleges in recent years had certainly led to an increasing output of chemists with qualifications, said Dr. Frank Hartley, director of research, British Drug Houses Ltd., at the same R.I.C. discussion. But he is concerned with quality. "Many of us think that concern with quantity has been at the expense of concern with quality." Like Mr. Moore, he sees present courses of study as designed to enable students to pass examinations. All too often, Dr. Hartley remarks, graduates may have accumulated very many facts but little skill in the use of facts, and this suggests that the examinations are thought of as the be-all and end-all both by the teacher and the student. "A capacity to question, to think and then apply theory to practice for new developments is not being adequately fostered by external examination systems and the packed cramming courses which they engender."

Also concerning Dr. Hartley and many other chemists in industry is the lack today of regard for the importance and value of practical work in graduate courses and graduate examinations. As Dr. Hartley says what is the use to industry of measurements without interpretations. The chemist should be distinguished from the technician by his ability to handle the results of measurements.

What hope is there then of increasing quality? It is suggested by Dr. Hartley that there should be a concentration of our resources, and in extending selected centres of education rather than spreading our teaching resources too thinly over too many centres. The policy of limiting the number of colleges of advanced technology and regional colleges should be adhered to so that "they can develop in status and resources thereby enhancing the quality of their own work and that of their students". This policy should be supported by industry.

It is recognised that in addition to top-grade chemists there is a great need for many chemists of lesser grade to provide valuable technical assistance. It appears, however, that many more of the students taking chemistry sandwich courses are college-based rather than industry-based. Also it seems that recent developments in education in chemistry are tending to diminish the outlook of, and the capacity to recognise and accept responsibility of, our future chemists. There is no doubt that with development of education in chemistry, it must be ensured that there is also development of education of chemists so that, as Dr. Hartley states, "chemists can play their full part, not only in industrial development, but in our national development".

AUSTRALIA'S MINERAL INDUSTRY

SOME upturn in demand for raw materials was noted by Australia at the end of 1958, and it is expected that that upturn will continue this year. Since 70% of Australia's mineral industry is absorbed in domestic industries, the industry is related to domestic conditions.

Exports, it is thought, may show little difference in value from the 1958 total figure. The minerals whose export sales are likely to improve are asbestos, rutile, ilmenite and tungsten. On the import side, very little change is expected. The main items, rock phosphate, sulphur and tin are likely to be about the same, any tonnage increase for sulphur being compensated by a lower average price.

According to Dr. J. A. Durn, chief mineral economist, Bureau of Mineral Resources, Canberra (*Chem. Engng. and Mining Rev.*, 1959, **51**, No. 4, 28), the fall in production in beach sands to about 70,000 tons rutile and 50,000 tons zircon in 1958 may be arrested and for 1959 is expected to be not less than these figures. A rise in price much above £40 for rutile is deemed unlikely at the present time. The ilmenite market, it is suggested, will remain highly competitive, although the vigorous efforts at marketing by Australian producers may have some reward. It is anticipated, however, that the full domestic capacity of almost 300,000 tons ilmenite will not be operated in 1959.

With regard to sulphuric acid production, additional plant capacity, particularly with the Mary Kathleen plant working for a full year, is estimated to bring the total Australian acid production up to almost 1.1 million tons. As much of the increase is from elemental sulphur, however, the proportion of acid derived from sulphur of indigenous origin is likely to fall well below 50% of the total.

HOW DALAPON KILLS GRASS

DISCOVERY that the grass killer dalapon and related chemicals kills plants through vitamin starvation, and finding out just how this is done, may lead to the development of more specific and better weed killers. Dalapon interferes with a plant's formation of pantothenic acid.

The mechanism of dalapon's lethal action was discovered by U.S. Department of Agriculture plant physiologists J. L. Hilton, W. A. Gentner, and L. L. Jansen at the Beltsville Agricultural Research Centre, and biochemist J. S. Ard at the U.S.D.A.'s Eastern utilisation division.

Normally, pantothenic acid is synthesised within a plant by enzymatic action on two known chemicals, pantoate and β-alanine. The plant enzyme has separate sites within its molecule for attaching on to each of these chemicals. The enzyme acts to bind the other two chemicals to itself, temporarily forming a single large compound. Then, the enzyme withdraws from the compound, leaving the pantoate and β-alanine in chemical combination as the new vitamin. Dalapon and its related compounds also readily attach to the enzyme site for pantoate attachment. When this happens, the enzyme cannot combine pantoate and β-alanine, and the vitamin is not synthesised.

One of the new chemicals that has been developed and is being laboratory-tested is a compound comprising part of the chemical structure of pantoate plus the addition of a chlorine atom. The chlorine replaces the hydroxyl groups that pantoate normally contains.

It has been found that the new compound retains the ability to attach itself to the enzyme, but, because of the chlorine, is unable to combine with the β-alanine. Thus, the changed pantoate compound produces the same lethal effect as dalapon and its derivatives.

Prof. Stacey Heads B.A. Chemistry Section

PROF. M. STACEY, F.R.S., head of the Department of Chemistry, Birmingham University, will give the presidential lecture on 'Medical aspects of carbohydrates' to the Chemistry Section at the annual meeting of the British Association in York, 2-9 September.

Subjects for papers and discussions in the Chemistry Section include 'Chemical structure of proteins,' 'Chemistry and clothing,' 'Rocket fuels,' and 'Chemistry and the preservation of antiquities.'

The Chemistry Section will meet in St. John's College, Lord Mayor's Walk.

Visits will take place to the School of Chemistry, Leeds University; Wool Industries Research Association, Leeds; Associated Chemical Companies Central Research Laboratories, Leeds; British Oil and Cake Mills, Selby; I.C.I. Fibres Division, Harrogate; Hickson and Welch, Castleford; John Smith's Tadcaster Brewery; D.S.I.R. Humber Laboratory, Hull; Eskimo Foods, Hull; Cleveland Product Co., Middlesbrough and Derwent Plastics, Stamford Bridge.

On Thursday evening, 3 September, questions from an audience of children and adults at an open forum will be answered by a panel including Dame Kathleen Lonsdale and Dr. I. J. Faulkner, of I.C.I.

£800,000 Office Block for Boots Pure Drug Co.

WORK has begun in Station Street, Nottingham, on the erection of an £800,000 six-storey office block for Boots Pure Drug Co. Ltd., the first stage of a ten-year office building programme being carried out by the company. It is scheduled for completion early in 1961 and will allow for a 30% expansion in the firm's need for accommodation for office facilities.

The new building will be the fifth major construction carried out by Boots in Nottingham since the end of the war, with erection of a large printing works, a power house, a new warehouse block and the £750,000 biological research and standards laboratory block which is near completion.

It is planned to bring together in the new block several departments which are at present scattered in various buildings in Nottingham.

N.F.U. President to Open Fisons' New Fertiliser Factory

Fisons Ltd.'s new 25-acre factory, built for the manufacture of ammonium nitrate, at Stanford-le-Hope, on the Thames Estuary, will be officially opened on 9 June, by Lord Netherthorpe, president of the National Farmers' Union.

Inauguration of this plant, first of its kind in Europe, will mark the beginning of an important development in the manufacture of Fisons agricultural fertilisers. When the plant is operating at full capacity, it will be producing approximately 140,000 tons of ammonium nitrate a year.

Need for Quality in Chemists as well as Quantity—Hartley

EXPANSIONS in universities and technical colleges had led to an increasing output of chemists with qualifications, but many observers thought that concern with quantity had been at the expense of quality, Dr. F. Hartley (British Drug Houses Ltd.) said in a discussion on education in chemistry after the annual general meeting of the Royal Institute of Chemistry in Manchester on 17 April.

"The qualification—the examination—appeared to have become more important than the training and education" Dr. Hartley said. "Courses seem to have been designed all too often simply to enable students to pass examinations."

Dr. Hartley admitted that industry did not always make the best use of chemists, but said there still remained a heavy responsibility with teaching institutions and examining bodies.

Chemists in industry, he said, must be able to think and apply their knowledge in concert with that of other workers. All too often it seemed that graduates had accumulated many facts but little skill in the use of facts, which suggested that the examination had been thought of as the be-all and end-all by both teacher and student.

"We in industry want trained minds: we can add the technological backgrounds on which such minds can later operate" he added.

He pleaded for a livelier, more adventuresome approach to practical work, to be reflected in the examinations.

Dr. Hartley thought the best hope of increasing quality lay in concentrating resources, expanding existing university centres rather than creating additional ones. He advocated adherence to the policy of limiting the number of colleges of advanced technology and regional colleges so that they could be developed in status and resources.

Referring to the need for chemists of lesser grade as well, Dr. Hartley said he understood that most of the students taking sandwich courses were college-based rather than industry-based, and asked: "Does it reflect a presumed incompetence of technical college teachers to integrate a course in chemistry conveniently in time and adequately in content with industrial opportunities? Or does it reflect scepticism, unhelpfulness or just plain apathy on the part of industry?"

Mr. G. H. Moore, Principal, College of Technology, Bristol, said the list of developments in education in chemistry was a formidable one, but it would be many years before they had their full effect. The new Diplomas in Technology would surely be of major importance and welcomed by industry.

"Educational freedom for staffs to plan and carry through courses of training suited to the needs of the day will result in a less rigid pattern of examination and a greater measure of concentration on the presentation of fundamental concepts."

I.C.I. Billingham May Replace Coal with Oil as Source Material

BOARD of I.C.I.'s Billingham Division is "thinking very seriously" about the possibility of eventually turning completely from coal to oil as a raw material for the production of chemicals. The change might have to be made if Billingham were to remain competitive. If it came about, it would be a gradual process that could not be completed within 10 years.

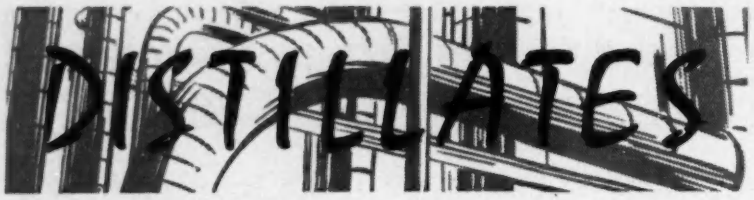
This was stated last week by Mr. W. d'Leny, division technical managing director, on the occasion of the visit by the company's fertiliser agents (see also CHEMICAL AGE, 25 April, p. 696).

At present the division uses about half of its coal as a source of chemicals and the remainder as fuel. If there were complete conversion to oil as a source material, then the factory's coal consumption would be nearly halved. Mr. d'Leny added that any policy decision would be made as a result of recommendations from the division board. As yet the board had not made up its mind that complete conversion would be the right thing. It was a very serious question and one which had to be considered with great care.

At present prices, oil was more expensive than coal, but as it was more efficient and the capital cost of plants was lower it was possible to save 10% on the cost of using coal. In the long-term view it might not be a bad thing for other people if the division reduced coal consumption as the coal used as a source of chemicals was Durham coking coal, the best in the world.

Mr. K. H. L. Cooper, division commercial director, pointed out that this country depended on the Middle East for its oil supply and that would have to be considered very carefully.

Asked if any further investment was contemplated in fertilisers during the next few years, Mr. d'Leny said "We are quite seriously looking at the next stage. I would not like to say when that date will be, but I think it is possible that in the next five years we will have another new plant."



★ LORD HAILSHAM, as minister responsible for D.S.I.R., made a spirited reply on Tuesday to the plea made last year by Sir Hugh Beaver for a Minister of Science. Then Sir Hugh had said "I do not myself think that with the best will in the world the Lord President of the Council is in a position to be head of our scientific thinking and planning. For one thing he has neither the means nor the time; secondly he has only a small part of the field in his control."

Lord Hailsham did not think that any single person was or could ever be "the head of our scientific thinking and planning". Science, he said, could not be thought of as a single subject; neither could it be abstracted from life, which it touched at almost every single point.

Speaking at the annual dinner of the Institution of Chemical Engineers he declared it was because the Government played a vital role as a patron of science that as far as possible scientific decisions should be in the hands of scientists themselves. Also the direction of scientific policy should not be wholly in Government hands.

If Sir Hugh's 1958 speech was controversial then Lord Hailsham's was also. His speech, with which many will disagree, and others at the dinner will be reported in CHEMICAL AGE next week.

★ I LEARN that an agreement is likely to be signed shortly between I.C.I. and Constructors John Brown to build the new Wilton polypropylene plant. This is not official yet, for neither company will confirm or deny it, but I gather that only the signatures are needed to make this one of the major contract awards of 1959.

So far nothing has been said about the contractors for Shell Chemical's polyolefins plant at Carrington which will provide facilities for 30,000 tons of polythene and polypropylene. It will be most interesting to see which is on stream first.

C.J.B. are certainly setting the pace for this new contract will follow swiftly the successful starting of the plant they built for Chemstrand in Northern Ireland. I am sure most of my readers will be glad to see that this main contracting 'plum' is likely to go to an all-British chemical engineering concern.

★ COST of corrosion in the U.K. has been estimated at £600 million a year, equivalent to 2s. in the £1 of the standard rate of income tax. But when Sir Owen Wansborough-Jones, chief scientist, Ministry of Supply, opened the 1959 Corrosion Exhibition at the Royal Horticultural Society's New Hall, London, on Monday, he doubted this figure. Sir Owen pointed out that the U.S. figure of $6,000 million was far smaller in terms of national income and tax, while the Indian figure for annual corrosion loss was put at between £40 million and £100 million.

He suggested that the most important effect of corrosion was not the immediate damage it did, but the more subtle losses in reliability, extra costs in maintenance and extra wear in mechanical equipment.

Whatever the actual cost of corrosion in this country, a visit to the exhibition shows that it is big business and one in which the chemical industry has a vital interest.

★ CHOICE of Professor T. P. Hilditch to open the new centralised control laboratory at the Stork Margarine Works (see page 731) was appropriate. Not only is he one of the world's leading authorities on the chemistry of oils and fats, but he served 14 years with one of the Unilever Group, Joseph Crosfield and Sons. Warrington, then pioneers in fat hydrogenation, whom he joined in 1911.

He left this post on his appointment as Campbell Brown Professor at Liverpool and was elected an F.R.S. in 1942. Notable among his work at Liverpool were his activities in conjunction with the Colonial Office in the study of the vast range of tropical fats.

He has worked actively in the Royal Institute of Chemistry, the Chemical Society and the Society of Chemical Industry. His book on 'The Chemical Constitution of Natural Fats' is the finest reference book of its kind and is widely used by technologists in the industry.

★ A PAPER presented at the recent annual meeting of the American Chemical Society that will inflame the susceptibilities of Scotsmen everywhere—and many Sassenachs including myself—forecasts the production of synthetic whisky "identical in every respect to the best products available." The authors, R. B. Carroll, a consultant of Greenwich, Conn., and L. C. O'Brien of the Perkin-Elmer Corporation, Norwalk, Conn., said it would save considerable time and money by cutting out the maturing process.

Before achieving such heresy, major components of what the authors call "this beverage" will have to be identified. Some of the volatile substances are present in whisky to the extent of a few parts per million. So far 15 have been separated from whiskies and 10 of those have been identified chemically.

Using a Perkin-Elmer vapour fractometer in conjunction with gas chromatography major differences were found in the ester, fusel oil and acetaldehyde content of vodkas and gins as compared with rums, Scotch whisky, ryes and bourbons. I am glad to learn that Scotch has a lower content than other whiskies of these undesirable minor components. Perhaps this explains why Scotch is less apt to produce a hangover than rye or bourbon.

★ A HISTORIC meeting took place in the rooms of the Chemical Society, London, on 15 April, when representatives of eight countries met to discuss the formation of an International Federation of Societies of Cosmetic Chemists.

This Federation would link together the various autonomous national societies into an international body, capable of acting in such fields as international standards, establishment of the professional status of the cosmetic scientist, publication of bulletins, abstracts and reviews on cosmetic science, to name only a few.

Countries represented were: Belgium, Denmark, France, Germany, Great Britain, Norway, Sweden and the U.S. Agreement was reached on a provisional constitution. The delegates are now returning to report to their national societies and as soon as possible a second council meeting will be held to draw up a final constitution.

★ To test the design of their new series of vertical axial flow propeller type pumps—the H type—the Kestner Evaporator and Engineering Co. of London, have enlarged their testing facilities by the erection of a special rig that can handle liquor flows of up to 10,000 gall. per hour.

This embodies six vertical pipe sections each fitted with orifice plates with full-diameter and half-diameter tappings and mercury filled U-tubes. The pipes are so arranged that any number can be cut out for the testing of smaller pumps. A valve fitted into the horizontal bottom section allows the flow rate to be adjusted when testing the smaller pumps. It is obvious that, with the smaller total flow, readings across the orifice plates would be too low to provide significant figures, especially with all six pipes in operation. Two pitot tubes are fitted in both inlet and outlet pipes at right angles to each other and in the same plane.

★ AT SOME time or another most of us have wished there were 48 hours in the day. I often wonder how the average chemist divides his day to get through all the work he has to. Now I know, for a survey has been made in the U.S. into the working day of the typical 40-hour a week chemist.

This shows that he spends by far the longest time—16.7 hours—in the reading and writing of scientific material; 7 hours in the reading and writing of business letters; 10.5 hours in laboratory work; 3.2 hours in the calculation of the results of experiments; and 2.7 hours in the planning of new experiments.

Alembic

I. Chem. E. Presidential Address

Lag in Trained Chemical Engineers Not Being Made Up — Sir Hugh Beaver

LAST year Sir Hugh Beaver, in his presidential address to the Institution of Chemical Engineers concluded that compared either with the U.S. or with the U.S.S.R., and in some ways with West Europe, particularly West Germany, the U.K. had lost, and was still losing, ground in keeping pace with our own scientific demands and with the scientific expansion of our competitors. In this year's presidential address, Sir Hugh again reiterated this belief.

Referring to the report of Professor Solly Zuckerman's Committee on Scientific Manpower published in 1956, Sir Hugh noted that the estimated requirements of chemical engineers including Government departments and Local Authorities by 1959 was given then as as 2,200; and that there should, in the Scientific Manpower Committee's view be by 1966 at least double the number of chemical engineers there are today; that is to say about 4,400. These figures, Sir Hugh believed were far short of the real requirements. They were in fact far short of the membership of the institution today, and of the calculation of membership recently made:—1958, 4,277; 1961, 5,900; 1963, 7,000; 1965, 8,800; 1967 11,100.

Although the last eight years have shown a great change here, it is only in the last two or three years that the rate of increase has approached that of the U.S.

Relative Strength Compared

To give some idea of the relative strength of chemical engineering today in the U.S. and U.K., Sir Hugh indicated that the 1958 figure for the U.S. was about 9.7 per 100,000 of the population, while the corresponding ratio for the U.K. was 6.1 per 100,000. "Nor do our latest estimates of output of qualified chemical engineers justify us in thinking that this lag is yet being made up". The figures as they stood showed that the growth of chemical engineering in this country had been and would be faster than the Scientific Manpower Committee's estimates and even so had been too slow. A recent calculation by the institution put the proper figure for 1956 at 5,000.

With regard to the production of chemical engineers, there was no doubt that there had been "a remarkable change of attitude in the last few years".

Annual output of chemical engineers from the universities in about five to six years' time (about 1966) was estimated at about 950.

It would be incorrect to assume said Sir Hugh, that the failure or short-fall in qualified chemical engineers lay only, or indeed primarily, on the teaching or production side. It lay equally on industry. Recognition of chemical engineering by U.K. industry had so far been "slow, irregular and sporadic". As some indication of the demand from industry for engineers, he added that the productivity team which visited the U.S. in 1953 had found that in the heavy chemical factories which they had visited there was one

Sir Hugh Beaver, whose presidential address is reported here, is to join Sir David Eccles on his trade mission to Russia in the middle of May

technically qualified man to every six workers; whereas the ratio in this country was then 1:16.

Of the U.S.S.R., Sir Hugh said that their chemical industry was now only about a third of that of the U.S.; but a 7-year programme announced last year aimed at trebling the chemical output by 1965, while dramatic and surprising advances were planned and already partly achieved in other countries, such as India, Japan and China.

Referring to Dr. Linstead's Hinchley memorial lecture last year, Sir Hugh said that the nominal time for a first degree in engineering was three years, which was less than in almost any other country in the world and was only possible by reason of the high level of attainment in the secondary schools. On the Continent the nominal time was from four to five years with variations of even up to seven or eight years. The average time in Russia in getting a first diploma was about five-and-a-half years. There was also a great deal more specialisation in the college period abroad than was considered desirable in this country.

Two caveats, obvious but important, Sir Hugh thought should be entered. In the first place work training had to be scientific and methodical, carefully thought out and systematically applied. Secondly, the system of education, while avoiding the specialisation of the Continent had to produce a sufficient proportion of research students.

There were no doubts as to the need for a broad-based training but, said Sir Hugh, in a world which was becoming so highly specialised, it had to be considered whether that broad approach could always be afforded; so that the average man was only beginning to specialise when he was perhaps nearing 30 years of age, and past or nearly past the peak of his imaginative and creative ability.

So far as chemical engineering was specifically concerned, there were now of the order of four dozen or so companies in the country with approved graduate or student apprentice courses. One company estimated that the all-in net cost of the two years of training was between £2,000 and £3,000. Another—one of the largest companies in the U.K., Sir Hugh said, put it at £1,750, but he thought that this sum did not allow anything special for overheads.

Industrial concerns had told Sir Hugh that the graduate-trainee was, after his three years at college and his 2-2½ years of industrial training of more value to the company than those entrants who came later with a higher degree after spending five or six years at college.

1959 Output of Chemical Engineers

University	Estimated Output in 1959 First Degrees	P.G. Diplomas	Sandwich Courses
Birmingham			
Cambridge			
Durham (King's College)			
Edinburgh			
Glasgow (Roy. Coll. of S. & T.)			
Leeds	314	90	—
London (Imperial College, King's College, University College)			
Manchester (College of S. & T.)			
Sheffield			
Wales (University College, Swansea) ...			
Colleges of Advanced Technology:			
Battersea			
Birmingham			
Bradford	27	21	29
Loughborough ...			
Salford			

With regard to the question of research, experience in different colleges as to the number of graduates staying on to do research, or coming from outside having obtained degrees elsewhere, varied immensely. Equally variable also was the practice in different universities in regard to the external, and in particular, the industrial sponsoring of research work. Sponsored research was both necessary and valuable. It was felt by many U.S. universities that sponsored research might have gone too far, but Sir Hugh said he believed it to be essential for our national progress that there should be an alliance in this matter between industry and university.

Hardy's £2m. Fertiliser Orders

Three overseas orders for fertilisers worth £2 million have been won by M. W. Hardy and Co. The company are to supply 50,000 tons to Spain, 40,000 tons to Indonesia and 25,000 tons to Egypt. Deliveries start next month.

W. K. Hutchison, S.E. Gas Board, Succeeds Sir H. Beaver

THE election of Mr. W. K. Hutchison, chairman of the South Eastern Gas Board, to be president of the Institution of Chemical Engineers was announced at the annual general meeting in London on 28 April.

The vice-presidents are Mr. E. LeQ.

W. K. Hutchison

Herbert (Shell Refining Co. Ltd.), Mr. C. E. Spearing (Kellogg International Ltd.), and Prof. M. E. J. Cathala.

Mr. F. E. Warner and Mr. R. C. Odams have been re-elected joint hon. secretaries, and Mr. F. A. Greene hon. treasurer.

Annual Report Shows Membership Rise of 458

Measures for dealing with deficits of £766 in 1958 and £2,429 in 1957 are summarised in the annual report of the council of the Institution of Chemical Engineers which was adopted at the annual meeting on Tuesday.

These were: an investigation of clerical procedures and practices carried out by the I.C.I.'s office administration department; a private appeal to certain industrial companies for financial help during the seven-year period 1958-65 on the understanding that members would be asked to agree to increased membership subscriptions starting in 1959; convening of an extraordinary general meeting to approve proposals to raising subscriptions from 1 January 1959; a long-term investigation of means of substantially increasing the membership on a basis of widening and making better known the conditions governing election, but without reducing standards.

Membership at 31 December 1958 stood at 4,281, an increase of 458 over the previous year. Pilot surveys were being carried out in the north-west and south Wales and Monmouthshire to estimate to what extent chemical engineers employed in industry did not belong to the institution. At the same time, with the co-operation of several heads of college chemical engineering teaching departments, the council made a pilot survey of the extent to which past and present college students had been elected to membership of the institution. Committee of the Graduates and Students Section has been invited to make suggestions for increasing the student membership.

The report states that the careers advisory committee (chairman, Professor P. V. Danckwerts) was mainly concerned in 1958 with the planning of a careers film. The main problem, that of finance, had yet to be solved.

In Parliament

Minister to Consider Potash Subsidy

In reply to a request for a statement on the report of the Committee on Grassland Utilisation, Mr. J. B. Godber, Joint Parliamentary Secretary, Ministry of Agriculture, Fisheries and Food, said on Monday that those sections of the report of immediate importance for the Annual Farm Review had been considered. They included subsidies for fertilisers. Further consideration to the question of a subsidy on potash would be given when the report on the Monopolies Commission on fertilisers was available.

B.C.U.R.A. Show Work on Gasification and Fluorination of Coal

VISITORS to British Coal Utilisation Research Association laboratories at Leatherhead, Surrey, last week saw the work being done on gasification and fluorination of coal.

Open days were held on 22, 23 and 24 April to mark the 21st anniversary of the formation of the association. The guest of honour on the 22nd was Lord Mills, Minister of Power. The first day was devoted to members of the association and special guests, the second to representatives of Government departments, research associations, universities and technical colleges and the third to students from local colleges and schools.

In the course of researches into the fluorination of low-rank coals chlorofluorocarbons in the form of colourless oils and solids with properties pointing to suitability for use in industry have been prepared. Chlorine trifluoride is used as the fluorinating agent. Vapour phase chromatographic separation of the products is carried out. (See CHEMICAL AGE, 7 February, p. 239.)

To investigate methods of converting coal to gas, and ultimately to oil, the association has built an experimental fixed-bed slagging gasifier under contract with the Ministry of Power.

It consumes about a ton of fuel an hour and can take, in short tests, up to half of this in the form of pulverised coal. It has been operated successfully at various ash levels and over a range of ash fluidities.

The gasifier was constructed mainly as a tool for:

1. Developing a design of slag outlet and associated equipment to ensure reliable flow quenching and granulation of slag from low-grade coal with a minimum of heat loss. Studying the effect of varying the temperature viscosity characteristics of the slag on the behaviour of the slag stream, its quenching and granulation is an important part of the investigations.

2. Investigating means for improving the efficiency with which low-grade coal can be coverted into gas. Gasification of pulverised low-grade fuel injected into a bed of lump fuel is the means being investigated at present. The development of the optimum design of arrangements for introducing the gasifying medium and coal into the gasifier are an essential part of the investigations.

More incompletely gasified fuel is carried away from the fuel bed by the make gas when pulverised fuel is injected than during operation with only lump fuel supplied to the fixed bed.

The efficiency of gasification attained in the present design of gasifier, which is in the range 88-91% for purely fixed bed operation with coke, is reduced to 82-85% when up to 47% of the total fuel input is in the form of pulverised fuel. Further development is needed to reduce carryover of incompletely gasified pulverised fuel from the fuel bed. The overall oxygen consumption for 1,000 cu. ft. of $CO + H_2$ is estimated to be in the range 240-256 cu. ft.

Work carried out by the Chemistry Department includes the study of the plastic softening of coals, with a view to achieving better control of coking properties. The capillary structure of coke and chars is under investigation and recent knowledge gained in this subject has led to the association receiving a contract from the Atomic Energy Authority covering fundamental work of immediate importance.

Some of the investigations cover:

Chemical characterisation of pure macerals. Exinite, in particular, is being studied.

Selective halogenation of coals. An investigation of the products as intermediates for preparing materials of value to the chemical industry, e.g. ion exchange resins, is in hand.

Determination of carbonyl in solvent extracts of coals. Reductive acetylation, using a radioactive tracer, is employed.

Reduction of the aromatic system in coals. Reduction at room temperature and pressure is being studied.

Among services to members, the annual report mentions that the tray pelleting plant was employed to make a pelleted fertiliser. As the tests showed promise the plant was sold to the member for further tests in the firm's own laboratories.

STORK MARGARINE'S NEW CONTROL LAB

First Stage in Five-year Reconstruction Plan

NEW central control laboratory opened last week at the Stork Margarine Works was planned and designed by Mr. W. L. Wren, B.Sc., F.R.I.C., chief chemist. Design and layout is highly flexible and can readily accommodate the more elaborate instrumental techniques now being developed. Incorporating a number of novel features and costing about £100,000 it is among the largest and best equipped of its type in the world. Opening ceremony was performed by Professor T. P. Hilditch, C.B.E., F.R.S.

Representing the first stage in a £3.5 million five-year reconstruction programme at the Bromborough factory of Van den Berghs and Jurgens Ltd., the extensive laboratory facilities were formerly sited at two locations. Because this was inconvenient and incapable of expansion, the provision of a new centralised works laboratory was given top priority in the reconstruction scheme.

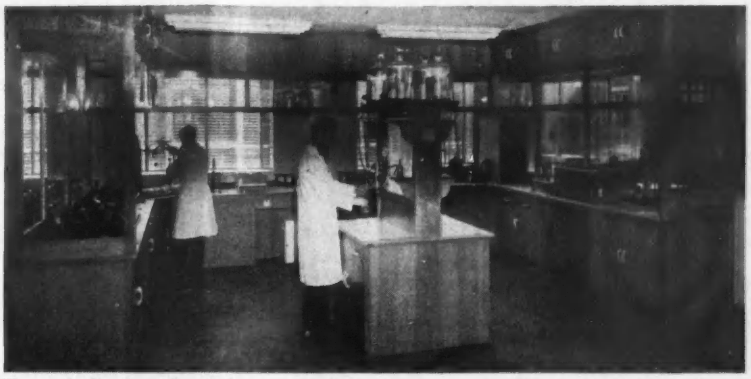
Fifteen Laboratories

Covering about 8,000 sq. ft. the new laboratory is divided into 15 laboratories and offices, accommodating a staff of 36, four of whom are graduates. The raw materials and finished products laboratory is equipped with Iroko wood topped oak benches. A special feature is the provision of a fume hooded bench area covering just over a third of the inside wall. This houses all apparatus generating steam or hot air, ensuring that working conditions are controlled only by central heating and not by the work in hand. Constant temperature rooms cover a temperature range of 0 to 50°C, and give controlled humidity. Titration facilities are arranged on a central bench specially designed for the purpose.

A number of Townson and Mercer thermostatic water baths have been installed in this laboratory. The bacteriological laboratory has, in addition to benches, several movable Formica-topped tables for work that is better done at table height. Two special features are a high temperature room for accelerated storage work and a tiled drained floor area masked by a vented hood for the installation of autoclaves.

The balance room has a concrete floor with a special 'raft' construction which eliminates vibration. The balance benches consist of tiled brick pillars surmounted by vibration pads and the tops are slate slabs. A wide range of Stanton balances is used.

This section is concerned with dairy control, maintenance of high standards of cleanliness in the plant and the regular examination of products at all stages of manufacture. Chemical control has the same aim and covers analysis of raw and intermediate materials and final products.

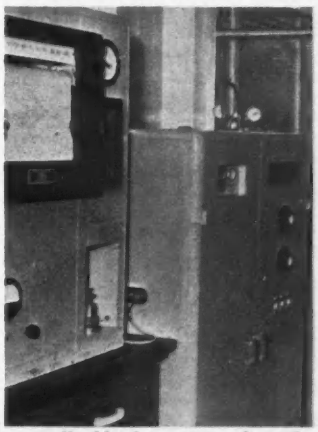


View of the fume-hooded area in the main raw materials and finished products' laboratory. Centre foreground are the titration facilities mounted on a specially designed island stand

The investigations laboratory, in which senior staff handle non-routine work, including methods, but not basic research, is fitted with special equipment. Main feature here is a gas-liquid chromatograph that was designed and built by the staff in conjunction with the Bromborough research department. Installed last week this will greatly speed work in the section and will enable the laboratory to handle determinations not previously possible in an industrial laboratory of this type. For instance ester fractionation using a chromatograph takes an hour or two compared with from two to three weeks using previous methods.

The Vitamin A assay laboratory has an island bench for the two Unicam u.v. spectrophotometers—a feature designed to facilitate easy operation and maintenance. Work on β-carotene is carried out here and it was emphasised that Stork margarine contains no synthetic food colouring or preservative material. The colour is the natural one provided by β-carotene. Both Vitamin A and β-carotene are supplied by Roche Products Ltd.

One of the novel features of the laboratory is an apparatus washing room, centrally located for all the sections. It was planned by engineers in conjunction with the work study staff and laboratory management. The room has two double drainer sink units, floor level sinks and four forced draught apparatus drying cupboards. It is expected that this will lead to savings in broken glassware.



The gas-liquid chromatograph and recorder designed and built by the research department

Standard solutions and solvent re-

(*Continued at foot of next page*)

Inspecting apparatus are, l. to r., Professor Hilditch, W. L. Wren, chief chemist, A. J. C. Hoskyns-Abrahall, chairman, and E. Reid, assistant general works manager

Letters to the Editor

Big Potential for British Chemicals in United States

SIR, I have read with a great deal of interest the editorial in your 21 March issue which reports on the remarks made by Mr. S. P. Chambers, deputy chairman of I.C.I., before the Plastics Institute. I do not entirely agree with his statements relative to exporting chemicals to the United States.

There is no doubt that overseas manufacturers are not pleased with the prospect of spending a considerable amount of time and money on promotional work and perhaps plant expansion and then meeting an increased tariff or other trade restraint. This fear, however, is unwarranted because any increase in the imports of chemicals that could possibly come about will not injure the American industry. It is in the more stagnant industries where the market is rather inelastic where our Government is responsive to the demands for protection. The chemical industry, unlike textiles for instance, is robust and cannot be said to need protection. The question whether imports will injure the chemical industry depends chiefly on how rapidly the market within the U.S. will expand. Since it is a dynamic industry with a growing market, imports may increase relative to domestic production without creating serious problems.

More Imports Would not Hurt U.S. Producers

Increased imports of chemicals will not seriously injure the U.S. chemical industry for three reasons: the increase in imports will be relatively small—because the U.S. manufacturers generally have a comparative advantage in the cost of production; the market is expanding rapidly enough so that additional imports will not displace established manufacturers, destroy capital values and require the migration of workers; the chemical industry is dominated by giant corporations producing scores of products. Therefore even if imports should seriously compete with a single product (tartrates, for example), neither the industry as a whole nor the individual company as a whole would be seriously injured.

The main point simply is that the U.S. chemical industry thrives and does not need the crutch of large tariffs or other trade restraints. It is for this reason that the President has rejected proposals for relief under the escape clause for producers of chemical products.

America's recognition of its international responsibilities is an indication of its awareness of the political, economic and social problems of this century. This awareness which has only recently taken root is spreading to the recognition that it is in the national interest to increase imports—and as pointed out they can be increased without damage to the chemical industry. Overseas manufacturers should recognise this. Otherwise, they will be getting a late start in a growing market for imported chemicals.

It is not necessary, of course, for overseas manufacturers to establish costly sales offices in the United States. There are a number of chemical import firms fully equipped to develop and handle sales for them. These 'import houses' conduct the necessary market research; undertake advertising and other sales promotion campaigns; and in some instances render technical service. Usually they work on a commission basis. Sometimes they buy and sell for their own account. In almost all cases they maintain inventories in the U.S. Therefore, an overseas manufacturer can take advantage of the increasing market for imported chemicals in the United States by working through one or more importers. And at very little cost—usually just a sales commission of 5 to 7½%.

U.K. chemical manufacturers do not seem to be taking advantage of the American market as indicated by the U.S. Department of Commerce's recently released report. Let us compare the U.K. with Germany.

U.K., U.S., and West Germany Chemical Trade
(In thousands of dollars)

	1956	1957	1958
Chemical trade between U.K. and U.S.			
U.S. Exports to U.K. ...	48,568	42,754	44,303
U.K. Exports to U.S. ...	18,860	20,408	17,135
Chemical trade between U.S. and West Germany			
U.S. Exports to West Germany	28,541	33,652	43,425
West Germany Exports to U.S.	34,314	37,534	41,379

In addition to exporting to the U.S., overseas manufacturers should consider the establishment of plants in the U.S. The investment climate is good. After all, U.S. manufacturers are investing abroad both alone and by teaming up with local companies in joint ventures. There are no real reasons why foreign manufacturers don't do the same thing in the U.S. Where else will they find the combination of companionship with a highly prosperous industry; a high and rising standard of living; increasing population and demand; raw materials such as coal, oil, natural gas, salt, sulphur, phosphate rock; abundant power; hardly any import and export restrictions; and readily available capital at low rates.

All in all, in my opinion, the U.S. market is well worth good hard consideration.

Yours, etc.,

JOSEPH M. BAIRD,
President.

Baird Chemical Corporation,
10 West 33rd Street,
New York 1, N.Y.

New Stork Margarine Control Lab

(Continued from previous page)

covery laboratories are combined. Solvents are recovered by distillation to B.P. standards of purity. A Townson and Mercer unit here enables the section to produce the large quantities of distilled water that are used.

Laboratory and office work has been separated and all the offices used by the staff have been sound-proofed.

Main contractors for the laboratory were A. Monk and Co. Ltd., Padgate, Warrington. Laboratory furnishing was handled by Cygnet Joinery Ltd., Bolton.

At the opening ceremony, Professor Hilditch was presented with a silver salver by Mr. A. J. C. Hoskyns-Abrahall, chairman of Van den Berghs and Jurgens. Welcoming the guests on behalf of Mr. J. D. Buxton, director, who was indisposed, Mr. E. Reid, assistant general works manager, said that from the earliest days it was realised that careful bacteriological and analytical testing was of vital importance if they were to market a great tonnage of products to the high standards of quality in which they could have complete faith and confidence The company was proud of the new laboratories which would enable their analytical controls to be even quicker in their effectiveness.

Professor Hilditch spoke of the comprehensive range of apparatus, from the older standard routine controls of fats to the modern spectrophotometer and gas-liquid chromatograph which enabled determinations to be made in a fraction of the time compared with the classical methods. He doubted whether even today the public realised the care given to the formulation of margarine, its appropriate content of Vitamins A and D, its production in different consistency in the warm and cold seasons, etc.

Ethylene Output in 1958 Was an I.C.I. Record

TURNOVER of the Heavy Organic Chemical Division of I.C.I. should be greater than in 1958 in spite of lower prices said Dr. S. W. Saunders, division chairman, recently at Wilton. It was not easy to determine what the profits would be but it looked as if they would be about the same as last year.

He declared that 1958 production of ethylene was a record, being nearly 7,000 tons above the previous year's figure. Production in 1959 should be greater still because another plant was coming on stream. Sales of butadiene were up compared with 1957 and it was hoped that 1959 would see a further increase.

Much of the increased sales of plasticiser alcohols was in export markets. There was a big future for carbonylation alcohols but, said Dr. Saunders, the division would have to bring prices down.

Analytical Review

Time-of-Flight Mass-Spectrometry for Vapour-Phase Chromatograms

RESOLUTION of mixtures which contain more than 10 to 15 components by the technique of mass-spectrometry is difficult and tedious unless high-speed computers are available to resolve the mathematical problems which are involved. Gas chromatography on the other hand separates such mixtures into their components efficiently and quickly, but the analyst is faced with the problem—particularly for non-routine samples, of identifying the various components revealed by the peaks on the recorder chart. This can be done by comparison of the retention volumes of the unknown component with those of known compounds on two or more columns with different substrates or alternatively by isolation of the fraction and identification by a suitable method such as infra-red, or mass-spectrometry. Obviously a combination of the techniques of chromatography and mass-spectrometry is a very powerful tool and it is used in many laboratories.

Samples from vapour-phase columns are almost invariably isolated for mass-spectrometry by condensation in liquid air-cooled traps, but this technique can be an exacting one where samples free from contamination by the atmosphere or previously eluted fractions are concerned. However, the time factor is perhaps even more restrictive for it may require 3-8 hours to resolve the components in a 10-peak mixture. The scanning time for infra-red samples is shorter, but the use of liquid microcells for the minute chromatographic fractions can lead to manipulative difficulties with the instrument which are frequently beyond the skill of the personnel who operate the machine. Direct I/R examination of the effluent stream suffers from the lack of sharpness of spectra of heated gaseous samples and loss of detail owing to the very fast scanning rate.

A Simple Technique

Gohlke (**1**) now reports in a paper from the laboratories of the Dow Chemical Co. that direct continuous monitoring of effluent streams from vapour-phase columns is made relatively simple by applying the techniques of time-of-flight mass-spectrometry. The instrument presents an oscilloscopic trace of the mass-spectrum 2,000 times per second, thus eliminating the need for isolation of the fractions normally shown as peaks on the chromatogram. With the particular instrument used, the resolution of adjacent mass units was complete for mass ≤ 200 and reasonable up to 450. Sensitivity was such that an argon partial pressure of 10^{-8} mm. in the ion source produced one recorded argon ion per instrument cycle (10^4 cps.).

Details of manipulation and technique will be found in the paper by those who are interested in the finer details although, to my mind at least, this side of the paper is somewhat scanty. However, be that as it may, it appears that this combination of techniques presents a very elegant means of characterising mixtures of sufficiently great complexity to render conventional procedures prohibitive with respect to time and cost. The author's claim of near ultimate power for mixtures boiling below 350° to 760 mm. pressure may well be justified.

By T. S. WEST, Ph.D.

This article reviews: (1) The application of time-of-flight mass-spectrometry to the monitoring of effluent streams from vapour-phase chromatography columns. (2) The application of high-drop rate polarography for the field testing of dissolved oxygen. (3) Some developments relating to the structure of the Eriochrome Black T indicator complex of magnesium; P.A.R.—a reagent closely related to the metallochromic indicator P.A.N.; titrimetric methods based on complexones for the determination of ammonium ion and the alkali metals

Polarographic Examination of Dissolved Oxygen. Determination of dissolved oxygen is easily resolved by polarography, but because of difficulties associated with the storage of samples of natural and industrial waters (even normal temperature variations can lead to appreciable errors) and the non-mobile nature of the dropping mercury polarograph, considerable difficulties are found in practice. The rotating platinum electrode provides a more portable set-up, but poisoning of the electrode necessitates frequent cleaning and re-calibration. Portable instruments with dropping mercury electrodes are not very successful for field analyses because movement of the instrument (e.g. on a boat) can cause erratic currents.

Tyler and Karchmer (**2**) have devised an instrument which circumvents these difficulties. It is based on the use of a horizontally mounted dropping mercury electrode of suitable dimensions which gives a drop time of only 0.25 second and a current which is insensitive to agitation since the time of the drop cycle is smaller than the vibration period. In addition, of course, a slow ammeter response smooths out the drop-ripple so that a more or less continuous steady current is recorded. The instrument devised for this purpose gave a sensitivity of 0.1 p.p.m. of oxygen in water.

The above mentioned paper is one of a series of three by Karchmer. The second (**3**) is concerned with the effect of varying the drop-time at constant mercury flow-rate. Currents produced a very low drop-time and gave a negative divergence from the Ilkovic equation. Very rapidly dropping electrodes were produced by cutting the capillary tip with a high speed abrasive wheel or by scratching the orifice of the capillary with a diamond needle. A capillary (vertical) which dropped at 1.33 seconds per drop in 0.1N KCl at 1.5 V, changed over to a rate of 0.385 second per drop in a horizontal position and 0.039 second per drop when the orifice was scratched and clamped vertically. However, the last mentioned very low drop-time produced disproportionately small currents and is not of practical use.

The argument originally proposed by Airey and Smales is accepted as a reasonable explanation for the disproportionately small currents. Briefly this postulates that convection and mercury vortex action cause the accumulation of depleted solution around the neck of the drop. If this is not entirely removed by the falling drop the new drop grows initially through a layer of depleted solution. If the drop-time is very rapid it is possible that it could exist during its entire lifetime in this layer of low concentration.

In the third paper in the series (**5**) abnormally high currents which are obtained at a drop-time of 0.25 sec./drop when the salt concentration of the sample is greater than 0.05N are dealt with. This effect which is scarcely noted at conventional drop-times (3-6 sec./drop) may be eliminated by massive dosage with gelatin, fortunately with little effect on the oxygen diffusion current. These three papers hold much of interest to those who are interested in the finer details of polarography.

Formation of Complexes

Complexometric Corner. Users of the technique of complexometry may be interested in some recent developments in this field. The formula proposed by Schwarzenbach and Biedermann (**6**) in 1948 for the complex formed between Eriochrome Black T and magnesium (or calcium) has been criticised by two sets of American workers. Whereas the Swiss workers reported a 1/1 complex in both cases, Harvey and co-workers (**7**) found that the complex was Eriochrome Black T/magnesium = 2/1 at pH 10.1 and Young and co-workers (**8**) reported that the ratio was 1/1, 2/1 or 3/1 depending on pH. Now Diehl and Lindstrom (**9**) have re-examined the problem and report that not only is a 1/1 complex formed in both cases (Ca and Mg) over the pH range 8-10, but the apparent stability constants and acid dissociation constants are substantially those reported originally by Schwarzenbach and Biedermann. The results obtained by the dissenting workers are ascribed to impurity of their starting materials.

While this paper may be of somewhat academic interest as far as the practising analyst is concerned, nevertheless the understanding of the fundamental processes involved is a basic factor which

cannot safely be ignored as it can frequently explain the reason why a reaction fails and consequently point the way to correction of the fault.

Pollard, Hanson and Geary (**10**) report on P.A.R. (P.A.N. with resorcinol replacing the naphthol part of the well-known complexometric indicator). The reagent is recommended for the colorimetric determination of cobalt, uranium and lead. It is claimed to be the most sensitive reagent for cobalt, the most sensitive water-soluble reagent for uranium and the first published water-soluble reagent for the colorimetric determination of lead. The stabilities of the complexes involved are unknown, but the water-solubility (relative to P.A.N.) of these complexes suggests a fruitful field of investigation for analysts who care to try out P.A.R. as a metallochromic indicator.

Sadek and Reilley (**11**) have reported what is essentially a complexometric titration of potassium and ammonium. The methods are, of course, indirect since neither ion forms a chelate with E.D.T.A. The presupposition of the authors that anyone would use a gravimetric technique to resolve a sample which contained sodium, potassium and ammonium is, to my mind at least, doubtful. Nevertheless, the titrimetric method which they propose as an alternative is an interesting one. Briefly, for ammonia it is based on the reaction

$$HgY^{-2} + NH_4^+ \rightleftharpoons HgYNH_3^{-2} + H^+$$

where the mercury-E.D.T.A. complex behaves as a Lewis acid towards the ammonium ion. The liberated H^+ ion is equivalent to the ammonium ion originally present. This method differentiates ammonium ion from free ammonia and the other alkali metals.

The method for potassium (duplicated by NH_4^+) depends on dissolution of the tetraphenylborate precipitate in dimethylformamide and treatment with Hg (II)-E.D.T.A. whereby mercuric tetraphenylborate precipitates and liberates an equivalent amount of E.D.T.A. The E.D.T.A. is then determined (after dilution with water) by titration with a standard magnesium solution and Eriochrome Black T. Apart from the merits of these methods analysts who may have occasion to feel dissatisfied with the Hg-Eriochrome end-point may find considerable interest in the authors' comments on the importance of buffer composition for this experiment.

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Shell Chemicals New 23-mile Pipeline System

WORK has just started on the laying of four underground pipelines, costing about £1 million, to connect the Shell Refinery at Stanlow with Shell Chemical Co.'s Carrington Works, near Manchester. Work has begun simultaneously from both ends. These four pipelines—for Shell Chemical Co. and not Shell International Chemical as stated last week in page 687—are in addition to two also being laid for Shell-Mex and B.P.

The Shell Chemical pipelines will transfer feedstock, chemical intermediates and finished products between Stanlow and Carrington. It is expected that the pipeline system will be completed by the end of 1959.

To cause as little disturbance as possible, the pipelines will be laid in four-mile stretches to a minimum depth of 2 ft. 6 in. below ground.

The pipes will be in continuous operation and elaborate precautions have been taken to prevent corrosion. They are bitumen-coated and in addition will have cathodic protection. The pipelines being used are the most up to date available, the welds being X-rayed before they are covered over to ensure complete safety. All the existing services over the route will be maintained during and after the pipe laying.

The route will be marked above ground and as an additional safety precaution line-walkers or examiners will inspect the entire route every day.

Butakon Latices in the Paper Industry

SYNTHETIC latices for the paper industry was the theme of a symposium held by I.C.I. Plastics Division at their Welwyn Garden City headquarters on 15 April.

About 70 representatives of the industry were welcomed by Mr. Maldwyn Jones, division development director, and heard talks on I.C.I's range of Butakon products for use in printing papers and boards. These latices confer attractive qualities on papers, including a high degree of gloss and better printing characteristics.

No Appeal Against Terylene Patents Extension

No appeal had been lodged by Monday against the five-year extension granted to the Calico Printers' Association's U.K. Terylene patents. The extension dates from 13 July 1958 and while technically either C.P.A., or British Celanese, who opposed extension of the patents, can still apply to the Patents Appeal Tribunal for a further extension of time to appeal, such a course is not thought to be likely.

Weir's £½m. Distillation Unit

G. and J. Weir Ltd. have received an order for a sea water distillation plant valued at over £500,000 from the Government of Kuwait. The plant, of the Weir 'Multiflash' type, consists of two units each of which will produce one million gallons of fresh water a day. This output is claimed to be the greatest output ever achieved by a single flash distillation unit.

New S.A.C. Methods for Determining Vitamin E

A SPECIAL meeting on the determination of Vitamin E, a collaborative study of quantitative paper chromatography and the development of a recommended method of analysis will be held at the Chemical Society, Burlington House, London W.1, on 20 May, at 7 p.m. Visitors will be welcome at this meeting. This Society for Analytical Chemistry meeting will precede a report on the determination of tocopherols in oils, foods and feeding stuffs that will be published in *The Analyst* for June.

This report represents five years' work by the Vitamin E panel of the analytical methods committee. The work has involved what is believed to be the first collaborative study of micro-analytical paper chromatography.

Members of the panel—A. L. Bacharach, Dr. J. Green, Dr. P. W. Russell Eggitt and R. J. Ward—will present short oral communications dealing with: nature of the problem and reasons for studying it; basis of the various methods for determining Vitamin E, particularly the recommended method; problems of technique; kinds of result obtained and their relevance.

Sir Hugh Beaver in Trade Mission to Russia

SIR HUGH BEAVER, managing director of Arthur Guinness, Son and Co. Ltd., past-president of the Federation of British Industries and retiring president of the Institution of Chemical Engineers, is one of four businessmen who will accompany the President of the Board of Trade, Sir David Eccles, on his trade mission to Moscow later this month.

Among a party of eight sent on a mission to the U.S.S.R. by the Water Tube Boilermakers' Association are representatives of Babcock and Wilcox, Simon Carves, International Combustion and Clarke Chapman.

British Titan's H_2SO_4 Plant Nears Completion

The £750,000 sulphuric acid plant being built for British Titan Products Ltd. at Billingham-on-Tees is nearing completion. It will have a capacity of 250 tons of 100% acid a day. Adjacent to the plant is the company's new office block, recently completed at a cost of £250,000. British Titan are the largest producers of titanium pigment in the Commonwealth.

U.S.S.R. Sign Contract For £2¼ M. Plant

The contract for the supply of a £2,200,000 synthetic fibres plant to the U.S.S.R. by Vickers-Armstrong (Engineers) Ltd. and Highpolymer and Petrochemical Co. Ltd. (CHEMICAL AGE, 14 March, p. 458) was signed in London on Monday, 27 April.

ENGINEERING EXHIBITION AT OLYMPIA

New Developments in Chemical Plant and Equipment Reviewed

MANY of the 500 exhibitors at the Engineering, Marine, Welding and Nuclear Energy Exhibition, which closed at Olympia this week, introduced new equipment for the chemical and allied industries. Some of these new developments are reviewed in this special report of the exhibition.

A. & W.'s Metal Treatments

Among new processes in metal treatments depicted by **Albright and Wilson (Mfg.) Ltd.**, London S.W.1, were the Plusbrite and Kanigen processes. The Plusbrite bright nickel plating process is stated to combine a fully bright finish with better physical properties of plate than have hitherto been available. Phosbrite 155 and 156, it was learned, were now being increasingly used for many decorative applications where the attractive bright etched appearance hides surface imperfections on cheaper grades of aluminium.

Kanigen plated aluminium and stainless steel is used for the **Savage and Parsons** master slave manipulator. Hand and tong head assemblies of the slave rely on Kanigen-plated aluminium and stainless steel ensures that, when handling radioactive or toxic material, the delicate precision components resist corrosion and are, at the same time, easy to decontaminate.

Paralloy Stainless Pipe Fittings

Of interest on the stand of **A.P.V.-Paramount Ltd.**, Crawley, was a display of the range of Paralloy "forging quality" cast stainless steel pipe fittings produced to the British and American standards employed in the petroleum, chemical and nuclear engineering industries. These cast fittings are fully interchangeable with their wrought counterparts for high pressure service and have been accepted by the leading petroleum companies as such. Each unit is fully radiographed and pressure tested. They are claimed to offer advantages in both price and delivery together with greater flexibility in meeting special requirements in size, design and material composition.

New Jointing Materials

A new range of Lascarflon proofed cloth jointings has been developed by the **Beldam Asbestos Co. Ltd.**, Hounslow, for use on pipelines, inspection covers, manholes and other equipment in service with corrosive liquids or strong acids. These jointings consist of high-grade woven asbestos cloth treated with a special p.t.f.e. compound, the cloth being processed to ensure thorough impregnation of the compound. They are designed for use at pressures up to 200 p.s.i. with temperatures up to 350°C, and are supplied in the form of sheeting, tape, or ready-cut joints in any required shape or size.

Centrifugal Single Stage Process Pump

Two new pumps were exhibited by the **British LaBour Pump Co. Ltd.**, Blundell Street, London N.7. These were the LaBour type DSZ direct mounting horizontal centrifugal pump and the MSZ horizontal floated suction centrifugal single stage process pump.

The DSZ is a single-stage pump for the process industries. Construction has been simplified by eliminating the bearing bracket and coupling the pump directly to the driving motor thereby shorting the overall length of the pump. It has a fully open-type impeller separable from the shaft. Pump back, impeller and motor can be withdrawn in one unit without disturbing suction or delivery pipes. Pump parts are completely interchangeable with the LaBour SZ type, and allow for easy servicing and maintenance.

A section model of type DZT demonstrated this pump's ability to handle efficiently a high proportion of gas as vapour in the liquid being pumped.

The MSZ type pump has been produced to handle corrosive and non-corrosive hot or cold liquids with capacities up to 1,000 gall. per min. with heads available up to 300 ft. This pump is pedestal mounted and is designed for quick dismantling without disturbing the suction or delivery connections. Dismantling is simple requiring only the disconnection of the cooling pipe, coupling space, and pump back from casing. Once released, the mechanical assembly is withdrawn in one unit. Perfect alignment of this pump is always assured. Liquid ends are dimensionally interchangeable so that different materials can be quickly substituted to suit different processes.

New Liquid Oxygen Storage Vessels

Latest developments for the storage and supply of liquid oxygen were shown by **British Oxygen Co. Ltd.**, Cleveland Row, London S.W.1. Two new vacuum-insulated vessels were shown, the first, the LC. 3 liquid oxygen cylinder having been developed to supply oxygen to customers not requiring the larger liquid oxygen installations. Its small size and large capacity—equivalent to 12 by 240 cu. ft. cylinders—means a considerable saving of space and economies in handling.

The cylinder consists of a vacuum-insulated vessel containing liquid oxygen, and incorporates a vaporising unit so that the oxygen is drawn off as gas. It will hold 2,900 cu. ft. of oxygen, and will supply gas at the rate of 300 cu. ft. per hour at a pressure of 85 lb. p.s.i. Its dimensions are 58 by 20 in., and it weighs 255 lb. when empty.

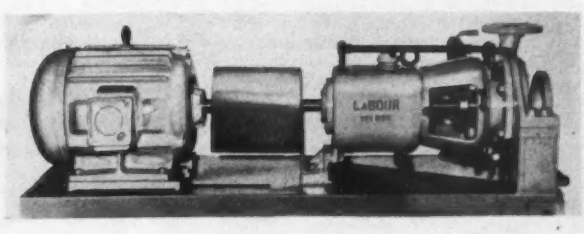
The Coval consists of a vessel designed for outdoor operation, to receive liquid oxygen from B.O.G. transport vehicles and convert this liquid oxygen to gaseous oxygen at a pre-determined automatically-controlled pressure. Maximum steady rate of gas supply is normally 30,000 c.f.h., but short duration peaks are available, the magnitude depending on the duration. Maximum pressure delivered from the Coval unit to the customer's pipeline is 230 p.s.i.g. Effective capacity of the Coval is 125,000 cu. ft. of liquid oxygen (equivalent gas volume); or 100,000 cu. ft. of liquid nitrogen or 122,000 cu. ft. of liquid argon.

A stainless steel vertical cylinder, mounted inside another cylinder of mild steel, holds the liquid. The two cylinders are separated by special insulating blocks, the annular space between them being filled with a powder insulant and evacuated to a very high degree. The outer vessel is mounted on three legs, the overall height of the unit being 15 ft.

A vaporising unit is necessary to vaporise the main liquid flow, to produce a pressure above the liquid and also to raise the temperature of the direct gas off-take from that of liquid oxygen to ambient temperature. This vaporising unit consists of a hot water tank heated either by electrical immersion heaters or by steam.

High Temperature Dial Thermometer

The principal exhibit of the **British Rototherm Company Ltd.**, Merton Abbey, London S.W.19, was a new high temperature dial thermometer specially designed for diesel engine exhaust gas and superheated steam temperature in-



British LaBour process pump, type MSQ, for hot liquids in the petrochemical industry

dication. It represents a considerable advance in its field and over 25 years of metallurgical research have been necessary to produce such an instrument capable of withstanding the high temperatures now experienced.

The element of special material will operate well within its limits up to 1,200°F, is free from oxidation up to 1,400°F and can withstand temporary overloads. It comprises a self compensating and shock resisting multiple helix carried in a stainless steel stem. The range is 200/1,200°F with dial sizes of 2½ in., 4 in. or 7 in. diameter giving a scale length of 5 in., 7½ in. or 14 in. respectively.

New Valve for Piped Solids

The need to develop special valves for the flow control of piped solids, such as grain, flake gelatine or cement, called for revolutionary techniques. These have been applied to the Mucon range of flexible sleeve valves shown by **British Steam Specialties Ltd.**, Fleet Street, Leicester. These valves work on a similar principle to the iris shutter in a camera, the flexible diaphragm (made of a woven fabric—normally nylon) forming a concentric aperture, which may be infinitely varied, from fully closed to wide open, by means of a ratchet handle at the side.

The Mucon valve is designed to control the dispensing of substances into sacks or bins from bulk storage. It is suitable for such diversified materials as granite chippings, rice or face powder, and the makers can offer solutions for problems like the control of materials which bridge or cavitate badly when in bulk storage. Mucon valves may also be used in conditions of vacuum and, with the right diaphragm materials, will handle the flow of air or gases.

Various types of diaphragm material are supplied with these valves. The standard nylon fabric is the most suitable at normal temperatures and for handling alkalis, but above 80°C, or when dealing with acids, Terylene or Teflon is better. Linatex rubber offers good resistance to abrasion, while both Linatex and natural sheet rubber are preferred under high vacuum, where the screen size of powders is smaller than the mesh of the standard fabric.

Thin-walled Beryllium Tubes

The **T.I. Technological Centre**, in association with the **Chesterfield Tube Co. Ltd.**, Derby Road, Chesterfield, have perfected methods for the extrusion of beryllium tubes (including finned tubes) suitable for use as reactor fuel cans. These extruded beryllium tubes can have walls as thin as 0.3mm. Tensiles tests in the direction of extrusion, visitors were told, have given ultimate tensile strengths of 60-75Kg/sy. mm. at room temperature and 38-40Kg./sq. mm. at 300°C.

Desulphurisation Using Calcium Carbide

Exhibiting for the first time at this exhibition were the **Distillers Co. Ltd.**, Devonshire House, Piccadilly, London W.1. Several exhibits indicated various uses of carbon dioxide. For instance, sudden evaporation of liquid carbon dioxide can produce cooling down to about 100°F approximately, at which temperature many soft and pliable articles become hard and brittle. In one application of this effect, it was shown, the 'flash' on newly moulded rubber and similar flexible components could be cleaned off by tumbling them in specially adapted machines. One such machine produced by R. Cruickshank Ltd., together with samples of tumbled articles supplied by P. B. Cow and Co. Ltd. were illustrated.

D.C.L., the largest U.K. producers of calcium carbide, report that in addition to its main uses, it is being increasingly used in the desulphurisation of iron. In some cases finely divided carbide is injected below the molten metal, using an inert gas as a carrier. This process was started in cupola iron for foundry production, and has been extended to blast-furnace iron in ladles.

The need to meter quantities of fluids accurately in connection with distillation processes, antibiotics research, catalyst dosing and similar operations carried out in the company's works and laboratories has led to the development by D.C.L. of a range of accurate metering pumps with variable stroke adjustment. Two 'Micro' pumps were shown with plunger-type heads illustrating how, by employing different drive mechanisms and plunger diameters, different capacities were readily obtained.

Atomic Fuel Cans of Impermeable Graphite

Results of work by the Royal Aircraft Establishment and the **General Electric Co. Ltd.**, Magnet House, Kingsway, London W.C.2, on the development of a type of graphite sufficiently impermeable for use as a canning material and moderator combined in the high temperature reactors were shown. One of the processes examined by G.E.C. depends on the formation of carbon directly from organic material and results indicate that graphite produced in this way can be as impermeable as glass or metals. Another method, involving impregnation and carbonisation, followed by high temperature treatment, produces a substance whose permeability is about 1 million times smaller than that of ordinary electrode graphite. Both substances can withstand very high temperatures.

Mobile Cold Chamber

A 500 cu. ft. transportable cold chamber, manufactured under Lloyd's survey, was shown by **J. and E. Hall Ltd.**, Dartford. Designed for shipboard use, the container was maintained at a temperature of −5°F throughout the exhibition.

Volumetric Determination of Sulphuric Dioxide

Apparatus was demonstrated by **Glass Developments Ltd.**, Brixton Hill, London S.W.2, for the volumetric determination of sulphuric dioxide in the atmosphere. The method employed is the bubbling of air through dilute hydrogen peroxide when SO_2 is oxidised to sulphuric acid. Acidity of the resultant solution is determined by titration with alkali and used to calculate the equivalent SO_2 in the air. Apparatus for investigating SO_2 pollution by the lead peroxide method was also shown.

Research Reactor

A 10 kW research reactor of a kind not formerly made in Britain is being built by the **Hawker Siddeley Nuclear Power Co. Ltd.**, Langley, Bucks. This reactor, called Jason, is based on a design by the Argonne National Laboratories, U.S., and is expected to start operating in September 1959.

Jason is of the thermal heterogeneous type, water-cooled and moderated, with internal as well as external reflectors. Its central region is basically a cube of graphite, containing a water annulus formed by two aluminium tanks. The fuel elements consist of a uranium oxide/aluminium mixture clad in aluminium. Maximum flux is about 1.5 by 10^{11} neutrons p.s.cm. per second at full power.

Being compactly built and fitted with reliable safety devices, the reactor is suitable for installation in universities, hospitals or laboratories, where it can be used for experimental work in conjunction with conventional equipment, or for the rapid production of radioisotopes —especially short-lived isotopes, not otherwise available. It will provide important information in the study of power reactors for a variety of new industrial processes.

'Honeycomb' Unit For Radioisotopes

Among the control instruments and assemblies shown by **H. M. Hobson Ltd.**, Fordhouse, Wolverhampton, Staffs, was the Hobson-A.E.R.E. 'honeycomb' unit for the manufacture of radioisotopes. This device is fitted through the biological shield of a reactor and can handle up to 70 different samples, requiring various periods of irradiation. The unit is loaded and unloaded by remote control, the samples being transported to and from the honeycomb assembly by means of carbon dioxide gas.

Air Filtration Equipment

Intermit Ltd., 44 Bradford Street, Birmingham 5, laid emphasis on two new ranges of products for which licences to manufacture were negotiated recently. These were the Far-Air filtration and air-conditioning products developed by the Farr Company, Los Angeles, U.S., and the complete range of Birfield-Hilco oil maintenance equipment developed by the Hilliard Corporation, Elmira, New York.

Far-Air filtration equipment is divided broadly into: primary filters; after filters; and automatic filters. Among the filters of interest, there was the HP2 filter which is used in conjunction with a 414 viscous panel filter. This latter stops the larger particles and the HP2 the small particles. The HP2 is claimed to have an efficiency in excess of 75%

in the 0-5 micron range. Where lower efficiency in the 0-5 micron range is permissible then the HP1 filter can be used.

The HP2 filter consists of a tough, practically tear-proof paper disposable medium, and is of the dry fabric type that can remove fly-ash, fine soot and similar smudge-causing particles from the air. Efficiency is stated not to vary with humidity. Absolute filters are available in several types for different atmospheric, temperature and chemical conditions. For economic use, it is recommended that they be used with some form of pre-filter such as the viscous panel filter or Roll-Kleen (a dry-type air filter which utilises a disposable roll of medium). Efficiency of 99.97% is claimed when tested by the methylene blue or dioctyl phthalate tests, i.e., with particles of 0.3 micron size. This filter can be used for temperatures up to 2,300°F in damp or acid conditions.

Metal Filter Cloth

Demonstrations given by the **Mond Nickel Co. Ltd.**, Thames House, Millbank, London S.W.1, included creep-resistance of the platinum metals, sub-zero properties, integral sheath thermocouples, and apparatus for testing the corrosion-resistance of materials under thermal load. A new material shown was a metal filter cloth produced by electroplating.

Measuring Flow in Large Pipes

New equipment for measuring large rates of flow of water quickly and accurately were demonstrated by the D.S.I.R. **National Engineering Laboratory,** East Kilbride.

In this salt-velocity method a pulse of salt solution of higher electrical conductivity than the water is injected into the pipeline by a cartridge-operated valve. The passage of the solution between pairs of electrodes at two downstream positions—a known distance apart—is timed automatically. Flow, it is reported, can be determined to within 1%, and the result is obtained immediately. Advantage of this technique is that it is a direct method of measuring large flows in which it is not necessary to measure the pipe dimensions.

Flow can also be measured with propeller current-meters or pitot tubes mounted at selected points on a cross-section of the pipeline. By placing the instruments at specially selected positions, more accurate results are obtained using fewer positions than hitherto. With current meters, the total flow can be obtained with an accuracy of ¼% within five minutes of the measurements being made.

New Hose Reel Foam Unit For Industrial Fires

Pyrene model F.R.U.1 hose reel foam unit, shown for the first time by the **Pyrene Co. Ltd.**, 9 Grosvenor Gardens, London S.W.1, provides adequate action against dual fire risks, calling for both 'cooling down' and 'smothering' types of fire-extinguishing media.

Consisting of a steel container, charged with 1½-gall. of foam-making compound and surmounted by a small mechanical foam branchpipe assembly, this appliance is designed for connection to an ordinary water hose reel, converting it in seconds into an effective foam-producing unit. The delivery can instantly be switched from foam to water to extinguish either freely burning or highly inflammable materials.

The Pyromet, another new extinguisher, is charged with 25 lb. of dry chemical powder that is discharged under pressure provided by a CO_2 cartridge. It is designed to extinguish fires involving such metals as sodium and calcium, etc., or magnesium and aluminium in the form of powder or swarf.

Decontaminating Radioactive Protective Clothing

Use of Rozalex No. 11 cream, made by **Rozalex Ltd.**, 10 Norfolk Street, Manchester 2, was demonstrated. This is stated to be an effective answer to the skin hazard associated with handling glass fibre. It has been found to afford a high degree of protection.

Cream No. 13 is another new cream and has been specially formulated for the U.K. Atomic Energy Authority with the prime function of making it easier to decontaminate protective clothing worn by personnel exposed to radioactive materials.

Developments in Vibratory Sieving and Straining

It was known that 600-800 gyratory vibrations per minute, imparted to a screening frame by means of an out of balance flywheel, produced an excitation of the screen's wire fabric which greatly increased sieving and straining effects, even through the finest meshes. At very high frequencies, however, centrifugal forces generated by the flywheel threw the material being sieved to the sides of the screen, with consequent reduction in throughput.

After research into the design of flywheels which would generate the maximum gyratory energy with the minimum centrifugal force, **Russell Constructions Ltd.**, Adelphi, London W.C.2, have evolved the Invicta fine screening machine, powered by a ½ h.p. electric motor, which operates at 2,800 vibrations per minute. A special form of suspension has made it possible to apply these extremely rapid and powerful vibrations to a screen 36 in. in diameter.

In the field of dry sieving, substances formerly considered too greasy, or liable to clog or blind the mesh, have been successfully handled with an Invicta. The manufacturers believe that these performances represent an advance in mechanical sieving and straining only likely to be surpassed by the ultimate introduction of electronically vibrated screens.

New Vacu-Blast Model

The new Major Mk. II machine was shown for the first time by **Vacu-Blast Ltd.**, Bath Road, Slough. It has been introduced to maintain an economical blasting cycle on open Vacu-Blast applications and gives sufficient capacity for about 30 minutes open blasting, enabling a large area to be cleaned in each cycle. Spent abrasive can be recovered in a matter of minutes and blasting can then be resumed. This model can be used to establish 'clean conditions' in reactor vessels, heat exchangers and ducting.

Besides its use on ferrous metals, Vacu-Blast is said to be successful on

Cleaning the internal surface of a large vessel using the open Vacu-Blast technique

aluminium alloys, Nimonic alloys, yellow metal alloys, Durestos metal, resin bonded lamina and thermosetting plastics. A new use in the rubber and plastics industries is for surface preparation prior to covering with anti-corrosion materials.

Plastics Valves

For duties in acid laden atmospheres, **Saunders Valve Co. Ltd.**, Cwmbran, Mon, had available for the first time Saunders spherical plug, type 'M' valve. This is offered in eight sizes from ½ in. to 3 in. If required nylon-coated plugs may be specified for the type 'M' valve; these are stated to substantially increase working pressures and reduce the torque on this quick action straight-through design.

The company also showed their new '214' grade diaphragm, made of p.t.f.e., which is exceptionally resistant to chemical attack and can withstand, it is claimed, normal vacuum conditions or a working pressure of 100 p.s.i. Grade '214' is in sizes ½ in. to 4 in. for almost all chemicals at temperatures up to 150°C.

Flaw and Corrosion Detector

On the stand of **Sperry Gyroscope Co. Ltd.**, Brentford, Middx, the Introview flaw and corrosion detector was exhibited. This is being manufactured by Sperry under licence from I.C.I. The equipment employs eddy-current principles to detect corrosion, thinning, flaws and other abnormalities in non-ferrous materials, in particular copper and alloy tubes such as may be used in condensers and heat exchangers.

(Continued in page 740)

U.S. WORKERS ON SUCCESSFUL SYNTHESIS OF COENZYME A

TEST-TUBE production of coenzyme A was described at the American Chemical Society's 135th national meeting by Dr. John G. Moffatt and Dr. H. Gobind Khorana, British Columbia Research Council, University of British Columbia, Vancouver. Work on this project has been going on for about seven years.

Availability of coenzyme A is regarded as having special significance for an important new field of chemical research—the study of nucleic acid. Because of the great number of biochemical reactions requiring this enzyme, there has been a considerable demand for the compound from biochemists. Until now coenzyme A has been isolated from yeast in a fairly pure state but the process is laborious and the product costly (about $600 a gram, or $17,000 an ounce).

The synthetic coenzyme A is identical with the naturally occurring substance, according to Dr. Moffatt. Relatively inexpensive and plentiful substances are used in the synthesis, which is based on adenosine. The synthesis indicates a way to the synthesis of many other coenzymes, both naturally occurring and artificial. It is hoped, too, that with access to these compounds it should prove possible to throw further light on the ultimate mechanism of many poorly understood biosynthetic mechanisms.

Reaction Described

Dr. Moffat reported that the reaction between nucleoside-5′-phosphates, morpholine, and dicyclohexyl carbodiimide had been found to give high yields of nucleoside-5′-phosphoromorpholidates as their 4-morpholine N, N′-dicyclohexylcarboxamidine salts. The morpholidates were superior to the unsubstituted amidates in the synthesis of nucleotide coenzymes, in that they are readily soluble in anhydrous pyridine and also considerably more reactive. By their use uridine diphosphate glucuronic acid, guanosine disphosphate mannose, 3′-dephospho coenzyme A, and coenzyme A had been chemically synthesised.

Synthetic (±) 0^{23}, S-dibenzyl pantetheine [(±) refers only to the 2′ carbon of pantetheine] was phosphorylated with dibenzyl phosphochloridate and the protecting groups were removed with sodium in liquid ammonia, giving (+) pantetheine-4′-phosphate in 78% yield. The reaction of adenosine-5′-phosphoromorpholidate and (±) pantetheine-4′-phosphate in pyridine for 6 to 12 hours followed by ion exchange chromatography on ECTEOLA cellulose led to the isolation of (±) 3-dephospho coenzyme A in 63% yield.

Phosphorylation of adenosine with an excess of dibenzyl phosphorochloridate followed by hydrogenolysis and ion exchange chromatography gave a mixture of adenosine-2′(3′)5-diphosphates in 68% yield. Treatment of the mixed diphosphates with morpholine and dicyclohexylcarbodiimide gave pure adenosine-2′53′-cyclic phosphate 5′-phosphoromorpholidate in quantitative yield. Reaction of this compound with (±) pantetheine-4′-phosphate gave the biologically inactive 2′, 3′-cyclic phosphate form of (+) coenzyme A which could be chromatographically isolated. After mild acidic ring opening of the cyclic phosphate and reduction of disulphides, (±) coenzyme A and its 2′-phosphate isomer (iso coenzyme A) were obtained in an overall yield of 50% as a single peak by ion exchange chromatography. The mixed products were analytically electrophoretically, and chromatographically identical with natural coenzyme A.

Bradford Post-graduate Course on High Polymers

A POST-GRADUATE course in high polymer chemistry for one academic year will be held next session at the Bradford Institute of Technology. Successful students will be awarded a post-graduate diploma of the Institute.

The course will cover chemistry of high polymers (about 100 lectures); technology of polymers (about 50 lectures); general and economic studies (about 40 lectures); practical work; colloquia, conferences, special lectures and works visits.

A special short course on recent developments in the chemistry of plastics and polymers will be held at the Institute on 12 and 13 June, with an introduction by Dr. W. R. Moore, reader in high polymer chemistry; it will include five lectures.

Russian Chemists Describe New Process for Production of Synthetic Gas

WRITING in the Russian gas journal (*Gazov. Promyshl.*) for March, A. A. Anisonyan and co-workers of the VNIIG (All Union Gas Research Institute) describe their new method for obtaining a carbon monoxide/hydrogen mixture from Saratov natural gas containing on average 93% methane. They used an oxygen process under pressure, similar to that introduced in recent years in Italy and U.S.A., but, they claim, with some improvements. After laboratory tests a semi-industrial plant was built at Czaritsino, which to date has been in operation for more than 2,000 hours.

Briefly the process is as follows: Natural gas under 18-20 atm. pressure is filtered free from mechanical impurities, after which it is divided into two streams: one, after coming down to about one atm., passes for combustion in a heater, and the other goes through an oil separator, pressure control, and a high pressure magnetic rotameter (to measure consumption), thence to the heater. The heated gases are then mixed with oxygen which has also passed through a high pressure indicator. A special reactor is used. It has reaction channel with condenser coil in the lower part where hot gases are cooled down to 400-600°C with the aid of a pump that supplies 3,000 l/hr. water under 15 atm., and a feed tank. The gas mixture is further purified in a scrubber and filter. The reactor is heated with a methane/air mixture. Pressure control in various parts is nearly all automatic. Temperatures are controlled by thermocouples and mercury thermometers.

Principal factors governing successful operation include the thorough mixing of methane with oxygen, the temperature of their preliminary heating, their correct mixing ratio, duration of reactor stage. Refractory used for lining the reactor is also important, as are the methods of cooling and of purification.

Thorough mixing of the gases is essential to avoid formation of free carbon and reduce the risk of explosive mixtures. In one type of mixer that is said to have proved effective the burner pipe formed also the mixer tube. The combined burner-mixer was water cooled to prevent over-heating. For preheating optimum temperatures were at first decided as 450°C for the methane and 350°C for oxygen; but subsequently it was thought best not to heat the oxygen and to limit the methane heating to 360°C, otherwise the latter may ignite when mixed with oxygen. The O_2:C ratio may apparently vary between 0.773 and 0.742. The addition of steam in order to bring the H_2:CO ratio in the synthesis gas to about 2 was found ineffective. As regards timing, the process usually takes place in two stages: the first, burning of natural gas, is practically instantaneous; while the second—actual conversion—requires a little time. A feed rate of gas mixture of 100 cu. m./hr. was found most suitable for complete reaction and avoiding damage to refractory lining. This latter has to be carefully chosen to withstand conditions and temperatures up to 1600°C in the reactor channel. Alumina was eventually selected, made by a special method at the Podolsk refractory works.

Tartaric Acid Anti-Dumping Duties Application

The Board of Trade are considering an application for the imposition under the Customs Duties (Dumping and Subsidies) Act, 1957, of anti-dumping duties on tartaric acid imported from Italy, Spain and Western Germany. Any representations which interested parties may wish to make in connection with this application should be addressed in writing not later than 8 May 1959, to the Board of Trade, Tariff Division, Horse Guards Avenue, London S.W.1.

PROGRESS IN INDIA'S CHEMICAL INDUSTRY

No Licences for Sulphuric Acid Plants with Less than 25 Tons/day Capacity

OVERALL production of chemicals in India is at present about 95% higher than production in 1951. The comparative figures for the production of some of the basic chemicals before and at the end of the First Plan, the present production and the targets fixed for the Second Plan (1960-61) are shown in Table 1.

Sulphuric acid. There are at present 36 sulphuric acid units with a total production capacity of 290,000 tons a year. Of this, 28,000 tons are produced by the chamber process and the rest by contact process. To ensure economic production of sulphuric acid, the Development Council for Acids and Fertilisers has specified that licences for new units should be given only to those with a capacity not less than 25 tons acid a day. A great handicap for the sulphuric acid industry is the total dependence on sulphur imports. With the increase in the production of sulphuric acid from 60,000 tons a year in 1946 to 196,062 tons in 1957, the value of imports of sulphur increased from Rs.50 lakhs to Rs.2 crores.

Sulphur Sources

To achieve the target of 470,000 in 1960-61, about 200,000 tons of sulphur valued at about Rs.5 crores will be required every year. The Industrial Development Corporation has a scheme for the extraction of sulphur from Bihar pyrites. (See CHEMICAL AGE, 18 April, p. 664). Another possible raw material for sulphuric acid being considered is gypsum which is abundantly available in the country.

Soda ash. There are at present two plants for the manufacture of soda ash —the Tata Chemicals' plant at Mithapur with an installed capacity of 72,000 tons a year and the Dhrangadhara Chemical Works plant, at Dhrangadhara (Bombay) with an installed capacity of 36,000 tons a year. The total production during 1957 was 91,925 tons. Expansion schemes for additional capacities of 72,000 and 18,000 tons a year respectively are under way at these units. Two new units are under construction and are likely to come into production this year, one at Porbander (Bombay) and the other at Varanasi (Uttar Pradesh). The plant at Porbander will have an installed capacity of 40,000 tons a year, while the Varanasi plant will have a capacity of 66,000 tons a year. The present requirement of soda ash by various industries is 179,000 tons and it is estimated that it will rise to 230,000 tons by 1960-61. Total production after the completion of the expansion schemes of the existing units and the establishment of new units will be enough to meet the country's entire requirements. The new units will also produce soda ash of the heavy variety for the glass and dichromate industries. At present, the entire demand of this variety of soda ash (50,000 tons a year) is met through imports.

Caustic soda. Production of caustic soda has risen from 4,000 tons in 1947 to 42,653 tons in 1957, the present installed capacity being 51,000 tons. The consumption has risen from 40,000 tons in 1947 to 120,000 tons in 1957. There are at present 16 units in production and a new factory, the largest in India, with a capacity of 30,000 tons caustic soda per year in the first stage, is being built at Arumuganeri (Madras) by the Dhrangadhara Chemical Works. Later on the capacity of the plant will be raised to 50,000 tons a year. The factory is scheduled to come into production this year. The new soda ash factories will also produce caustic soda by chemical process to the tune of 35,000 tons a year. In order to expand the country's caustic soda production electrolytic cells which give caustic soda of rayon grade are to be used.

Indian Newsletter

- **Sulphuric acid capacity now at 290,000 tons a year is to be raised to 470,000 tons by 1960-61.**
- **New plants in hand will raise soda ash production by 196,000 tons.**
- **Big extension plans in hand for nitrogenous fertilisers include 70,000 tons-year of urea.**
- **Calcium carbide outputs are being raised to 41,600 tons a year.**

Nitrogenous fertilisers. One of the most important developments in chemical industry has been the establishment of the Sindri Fertiliser factory with a production capacity of 1,000 tons of ammonium sulphate per day. The total capacity for nitrogenous fertiliser production plants now in operation amounts to 86,000 tons in terms of nitrogen. The consumption of fertilisers has increased from 14,000 tons of nitrogen in 1949 to 21,000 tons in 1951 and 200,000 tons in 1957. The target of production in the Second Plan has been fixed at 370,000 tons nitrogen per year.

To meet the additional requirement, three new units are being constructed. One of the plants is under construction at Nangal in Panjab. It will utilise cheap electric power from the Bhakra Dam and will produce over 2.5 lakh tons of ammonium nitrate per year besides heavy water for atomic reactors. Another factory is being set up at the Rourkela steel plant. Utilising the coke oven gases of the steel plant, the factory will produce about 500,000 tons of nitrolimestone per year. The lignite scheme at Neiveli in South India envisages the production of 70,000 tons urea per year.

Sindri Project

An expansion scheme at Sindri, which was initiated in 1957 and which is nearing completion, will enable the production of 23,000 tons urea and 132,000 tons of double salt (ammonium sulphate-ammonium nitrate) per year. The Fertilisers and Chemical Factory, Alwaye, with a capacity of 45,000 tons ammonium sulphate per year, are constructing a plant for producing ammonium sulphate-ammonium phosphate (9,000 tons nitrogen a year). The new soda ash factory being set up at Varanasi will adopt the modified Solvay process for soda ash production and will provide over 40,000 tons of ammonium chloride as by-product. There is also a proposal to produce fertilisers from the waste gases of oil refineries. All these developmental schemes, when completed will raise the indigenous capacity to 380,000 tons a year of nitrogen.

Phosphate fertilisers. India is not in a happy position with regard to phosphate fertilisers since both the raw materials, i.e., rock phosphate and sulphur (for sulphuric acid production), are imported. There is thus a limit to the scope of expansion in this industry. The present installed capacity for superphosphate is 310,000 tons, corresponding to 50,000 tons of P_2O_5. Total production in 1957 was 141,678 tons in terms of 16% water soluble superphosphate. Additional capacity has been licensed which when implemented will raise the capacity to 550,000 tons a year which is substantially

TABLE 1

Status of heavy chemical industries

	Production in			Target for 1961
	1951 tons	1955-56 tons	1957-58 tons	tons
Sulphuric acid	106,932	165,215	196,062	470,000
Soda ash	47,532	84,235	91,925	230,000
Caustic soda	14,724	39,416	42,653	135,400
Liquid chlorine	5,268	15,076	15,693	17,000
Calcium	nil	2,889	3,596	24,000
Ammonium sulphate	52,604	388,990	379,654	1,600,000
Hydrogen peroxide	nil	325	611	1,500

short of the target of 720,000 tons for the Second Plan.

Calcium carbide. Consumption of calcium carbide during 1957 was 13,000 tons and the estimated consumption during 1958 was 16,000 tons. During 1960-61 it is expected to rise to 24,000 tons. There are at present three units in the country producing calcium carbide. The total production during 1957 was 3,596 tons. All three units have expansion plans; the Birla Jute Manufacturing Co., Calcutta, have a programme to expand the capacity of their plant to 6,600 tons a year by the middle of 1960, the Industrial Chemicals Ltd., Madras, to 10,000 tons a year by the middle of 1959 and the Chemical Industries Ltd., to 9,000 tons a year. Two new plants with capacities of 10,000 and 6,000 tons per year respectively are being set up by the Indian Carbide Corp. (P) Ltd., Bombay, and the Calico Mills, Ahmedabad. With the completion of the expansion schemes and the establishment of the new units, the rated capacity of the industry would be 41,600 tons a year.

Miscellaneous Chemicals

Production of potassium chlorate was 2,287 tons during 1957, but the capacity is to be increased to 4,500 tons this year which will be enough to meet the entire requirements of the country, estimated at 3,800 tons during 1960-61. The production of sodium and potassium dichromates (about 3,500 tons a year) is already sufficient to fully meet the requirements. There are 17 units for the production of aluminium sulphate in the country with a total capacity of 30,000 tons a year. By 1960-61, the demand is expected to be nearly 75,000 tons of which pure iron-free sulphate will be 10,000 tons. There is already adequate capacity for zinc chloride in the country.

There is at present no plant for the manufacture of sodium hydrosulphite, but two plants with a total capacity of 2,500 tons a year are being set up, one at Bombay and the other at Alwaye. Both the plants are expected to go into production in 1959. A licence has been granted for the establishment, at Ahmedabad, of a third unit with a capacity of 16,000 tons a year. The present consumption of sodium hydrosulphite is about 3,500 tons a year and it is expected to go up to 4,000 tons by 1960-61.

Dyestuffs. Organised production of dyestuffs in India began in 1953. Before that dyes worth about Rs.15 crores were imported. There are at present eight units producing all types of dyes. In Table 2 are given the figures for the present installed capacity, the estimated production during 1958 and the long-range demand taking into consideration the expansion in textile industry during the Second and Third Plans. The value of dyes produced during 1958 has been estimated at Rs.11 crores as against imports valued at Rs.5 crores. By 1961, the imports will not be more than Rs.2 crores. However, the dyes are manufactured mostly from imported penultimate intermediates. By the end of 1960-61, India will be producing sufficient quantities of basic organic chemicals like benzene, toluene, naphthalene, etc., as by-products from the coke ovens set up at the steel plants, and the Sindri Fertilisers plant. It is stated that there is need for setting up an integrated plant for the production of intermediates required for the dyestuff industry as well as for plastics, drugs, synthetic rubber, etc.

TABLE 2

Data for the production of dyestuffs

Dye group	Total existing and proposed licensed capacity	Estimated production 1958	Long range demand
	tons/year	tons	tons/year
Azo dyes	1,960	1,000	3,000
Basic dyes	1,000	—	750
Naphthols	1,150	700	1,250
Fast colour bases ...	1,150	400	1,250
Vat dyes	1,290	180	1,200
Sulphur black... ...	2,250	1,350	2,150
Other sulphur dyes ...	225	—	225
Dry and emulsion pigment	1,770	—	—
Rapid fast, Rapidogen & fast colour salts ...	650	400	—
Solubilised vats ...	197	125	—
Miscellaneous dyes ...	225	—	—

Drugs and Pharmaceuticals. During the past two years the industry has shown signs of general progress and the manufacture of many of the basic and intermediate chemicals has been undertaken. The indigenous processing capacity has increased in value from Rs.12 crores in 1948 to about 40 crores in 1957.

The Government recently approved a project in the private sector for the manufacture of vitamin B_{12}, steroids, sulpha drugs, chlorothiazide and other pharmaceuticals. The factory, to be installed at Bombay, will start production in 1959. Glaxo Laboratories (India) (P) Ltd., have recently set up a factory at Bombay for the production of vitamin A palmitate. Another plant for the manufacture of cortisone and dihydrocortisone is nearing completion.

Production of antibiotics in India started towards the end of 1955 when the penicillin plant at Pimpri went into production. The production of penicillin during 1957-58 was 21.58 million mega units as compared to 9.89 million mega units in 1956-57. The revised rated capacity of the plant is now 25 million mega units (original capacity, 3.4 million mega units) and a production of 24 million mega units has been planned for 1958-59. The present demand for penicillin in the country is about 50 million mega units and an expansion programme is under way at the factory, involving an expenditure of Rs.60 lakhs, to augment the capacity to 40 million mega units. The expansion programme was expected to be completed by April this year. Two concerns in the private sector have also been given licences for the production of smaller quantities of penicillin and it is expected that by 1959-60, the country will be self-sufficient with respect to penicillin. A scheme is also in hand to set up a plant for the production of 45,000 kg. streptomycin and dihydrostreptomycin per year.

Insecticides. There are two units for the production of DDT, one at Delhi and the other at Alwaye, each with a capacity of 1,400 tons a year. The present installed capacity for the two units producing BHC is 2,500 tons per year, which is also the production target for the year 1960-61. Thus the country is already self-sufficient with respect to these two insecticides.

Chemical Plant at Olympia Exhibition

(*Continued from page 737*)

It is stated to be a high speed non-destructive testing instrument which provides a permanent graphic record of the material tested.

Flameproof Motors for Monobloc Pumps

A new flameproof motor enclosure in the Monobloc construction was introduced by **Worthington-Simpson Ltd.**, Newark-on-Trent. The pump and motor combine to form a single compact 'balanced' unit requiring only one shaft, thus ensuring perfect alignment. Bedplates, couplings, pulleys and belts are eliminated, affecting savings in cost and space. The pump will operate in any position, including vertical, providing it is below the motor.

D.F.C. Monobloc chemical pump with totally-enclosed fan-cooled motor

A number of Monobloc pumps can be fitted with the new flame- and explosion-proof motors. These are in sizes ranging from 1 to 7½ h.p., 1,450 r.p.m.; and 1½ to 12½ h.p. 2,900 r.p.m. and are certified for use where inflammable gases or liquids are present.

New Tubes to Overcome Corrosion Problems

Among products shown by the **Talbot Stead Tube Co. Ltd.,** Green Lane, Walsall, were Bi-metal tubes, which combine suitable metals or alloys to resist most forms of double corrosion. If, say, a system is involved with ammonia in the pipeline and cooling water around it, a steel pipe sheathed with copper will resist both inner and outer corrosion. Following this development, Talbot Stead have introduced a technique whereby bars in ordinary carbon steel can be sheathed with a thin layer of stainless steel or other metal.

Metica tubes, a new development, were also shown. This tube is a metal-clad carbon or graphite tube which gives maximum resistance to corrosion and safety from breakage when piping hot or corrosive chemicals.

Overseas News

U.S. STUDY ON RADIOACTIVE WASTES DISPOSAL USING CERAMIC SPONGES

INVESTIGATIONS on a technique developed by Coors Porcelain Co., Golden, Colorado, U.S., using ceramic sponges have led to a full-scale examination of such sponges for disposal of liquid radioactive wastes. The work is now under the leadership of C. W. Christenson, health division of the Los Alamos N.M. Laboratories University of California.

Clay sponges are made using gas bubble foaming agents and highly absorptive materials such as calcined clays and diatomaceous earth. To fire the sponges' interior, naphthalene, wood, cork or organics are used as burnout materials. (The sponges are fired to about 1,140°F.) The sponge is soaked in the liquid waste, dried and resoaked; this cycle being repeated as many as three or four times. The final firing takes place at almost 2,370°F to bond the radionuclides permanently. Simulated wastes containing strontium 90 and caesium 137 were absorbed and fired to 2,370°F and subsequent leaching showed no radioactivity in the water.

In the tests carried out, the clay sponges have absorbed radioactive waste up to 200% of their own weight after four cycles. Cost estimates are not available at present but it is considered that they will not exceed those of liquid storage of wastes. A point in favour of the use of sponges is that the radioactivity in the wastes can be of value since the sponges contain radiation in useful physical form as sources of gamma and beta ray.

Soviet to Buy West German Polyester Fibre Plant

The Soviet Union is to buy from West Germany a complete plant for the production of polyester fibres with an annual capacity of 5,000 tonnes under the terms of a trade agreement. A plant for the production of caprolactam is also expected to be bought in West Germany.

Australian Fertiliser Project

Preliminary discussions between the Queensland Government and a number of big Australian companies associated with the chemicals and fertiliser industries have been held on proposals to establish a £A7 million to £A9 million fertiliser industry. The plan envisages production of nitrogenous fertilisers for Queensland's sugar-cane crops and for other important primary crops.

Companies represented at the talks were: M. Morgan Ltd., A.C.F. and Shireleys Fertiliser Ltd., Monsanto Chemicals (Australia) Ltd., Shell Chemicals (Australia) Pty. Ltd., Swift and Co. Ltd. and Fisons Chemicals (Pty.) Ltd. Also discussed were the possible use of Callide (Queensland) coal for the project and the development of new industries producing plastics and allied products. The talks also embraced the eventual establishment of an oil refinery in the State.

Formosan Soda Plant to be Built by West German Firm

A soda-producing plant has been planned for the Chinese Nationalist concern of South East Soda Manufacturing Co., by Zahn and Co., G.m.b.H., Hamelin, West Germany. The German firm has also been awarded a contract to supply all the plant and equipment in the face of strong competition, notably Japanese, at a price of nearly £600,000. An ammonia-soda process, specially modified for tropical conditions, will be used. To be built in the north-east of Formosa at Hsin Cheng, near the port of Suao, the plant will have a daily capacity of 60 tons.

Japanese Firms to Increase Polythene Output

Sumitomo Chemical Co. and Mitsubishi Petrochemicals are reported to be planning to increase their production capacity for polythene by 15,000 and 10,000 tons a year respectively. Japan's total requirements for 1959 are estimated at 60,000 tons, of which a large part has to be imported.

Hüls Double Their Capacity for Acetic Acid

With the recent bringing into operation of a production unit for acetic acid, Chemische Werke Hüls, Marl, West Germany, have doubled their capacity for the product. The new plant works to a continuous process involving the catalytic oxidation of acetaldehyde. The installation consists of a 59 ft. high reaction tower into which the basic materials acetaldehyde and oxygen are fed. The reaction takes place under normal pressure at a temperature of about 60°C.

Part of the acetic acid produced is processed further by the Hüls concern into butylacetate, but the greater proportion is sold to large-scale customers.

A.K.U. – Goodrich Marketing Company Begins Operation

On 1 April the marketing company formed by the Dutch Algemene Kunstzijde Unie N.V. and the B. F. Goodrich Chemical Co., of the United States began operations. The joint concern was set up last year under the name of N.V. Chemische Industrie AKU-Goodrich (N.V. CIAGO for short). The company now sells as a sole marketer the HYCAR-brand synthetic rubbers of the Goodrich concern within the Benelux group area. Later in the year it will also start distribution of four HYCAR types and one styrolbutadene latex (this latter for use in foam rubber manufacture) made by itself. The plant in which the company will undertake its own production will be opened, together with a laboratory for technical sales service, in August of this year.

Another Dutch-American tie-up will soon come into existence. The Haarlem firm of N.V. Ingenieursbureau voor Chemische en Physische Techniek Ph. J. Schuytvlot en Zoon will work in co-operation with the Fluor Corporation, of Los Angeles. A joint company will be set up under the name of Fluor-Schuytvlot N.V., with Mr. V. Schuytvlot, of the Dutch firm, as its head.

Czechoslovakia's Chemical Production Targets for 1965

According to a report issued by Comecon (a communist bloc body comparable with the organisation for European Economic Co-operation in Western Europe), targets set by Czechoslovakia for 1965 are a plastics output of 160,000 tonnes annually, a synthetic fibres output of 95,000 tonnes a year, a nitrogen fertiliser and a phosphate fertiliser production of 300,000 tonnes a year each, and a potash fertiliser production of 400,000 tonnes a year.

At Kralup, north of Prague, a plant is to be built on the banks of the Moldavia for the production of synthetic rubber and polystyrene at an investment of some 1,000 million k.c. The existing nitrogen plant at Sal nad Vahom is to extend its capacity by 300%, it is reported.

Ruhröl Abandon Production of Oil Derivatives

The Ruhröl concern of Essen, who have ceased mineral oil processing, will continue to produce ammonia, phthalic acid, maleic acid, fumaric acid and other intermediates—sales of which are rising. The company started the production of oil derivatives in 1952, but it was found that the small-scale production undertaken was uneconomic.

Wool Competition Lowers Synthetic Fibre Prices

Production of vinylon, nylon and vinyliden fibre in Japan, amounted to 5,211 metric tons in January, compared with 4,662 tons in December 1958.

Lower wool prices have led to a drop in the price of acrylic fibres.

Extension to Shell's Synthetic Glycerine Plant at Pernis

Shell Pernis Chemische Fabrieken N.V. have announced that consequent upon the favourable acceptance of Shell's synthetic glycerine in inter-

national markets, capacity of the synthetic glycerine plant at Pernis (Rotterdam) is to be increased. As a first stage in the expansion programme the capacity will be increased to a minimum of 15,000 tons a year. Production from the increased capacity is expected to become available early in 1960.

The synthetic glycerine plant of Shell Pernis Chemische Fabrieken N.V., the first of its kind outside the U.S., is part of a highly developed complex of chemical plants. The decision to increase capacity has been taken within a year of the commissioning of the original plant.

C.S.R. Chemicals Interest in Styrene Project

C.S.R. Chemicals Pty. will have a majority interest in the joint styrene venture that will form part of the petrochemical project at Altona, a suburb of Melbourne. This was shown when the new company C.S.R.C.-Dow Pty. was registered recently with a nominal capital of £A4 million. The Dow Chemical Co., U.S., are the other shareholders. C.S.R. Chemicals are 60% owned by Colonial Sugar Refining, Australia, and 40% by the Distillers Company U.K.

Rotary Carbon Black Drying Installation for Russia

An important order worth £18,000 has been placed with Dunford and Elliott Process Engineering Ltd., Linford Street, London, S.W.8, by V/O Techmashimport through the Trade Delegation of the U.S.S.R. in the U.K. for delivery to the U.S.S.R. of a rotary louvre carbon black drying installation. This installation will incorporate dust collection equipment and control equipment supplied by their subsidiary companies Thermix Industries Ltd., and Lindars Automation Ltd. respectively.

National Starch Change Name

National Starch Products Inc., U.S., have announced plans to change the corporate name to National Starch and Chemical Corporation, as from 8 May. As a result of the company's research and development work, it is today one of the two largest producers of vinyl acetate polymers and copolymers in emulsion form for adhesive, packaging paper, textile, paint and other industries. A substantial part of present sales are in chemical products and the change in name will reflect more accurately the company's interests, which in addition to starch and adhesives, include the synthetic resins mentioned above.

Cold Water Process for Tannin Extraction

Development of a cold-water process for the extraction of tannin from the bark of *Pinus radiata* is reported by the New South Wales Forestry Commission's Division of Wood Technology.

The bark of Australian-grown *Pinus radiata* has a high tannin content but extraction methods used with similar European species have not proved entirely satisfactory. The division have found that by using fine bark and water at room temperature as a solvent, a much lighter coloured extract, substantially free from insoluble materials, can be obtained in good yield. The extract, without modification, reacts readily and rapidly even at room temperature with formaldehyde. This reaction has been used experimentally to make a hot-press plywood adhesive and a waterproof cold setting adhesive.

New Textile Fibres By Montecatini

Societa' Polymer associated with Societa' Montecatini, intend to start, in a few months, the production of a new type of synthetic polypropylene fibre. A plant, with a capacity of 5,000 tons a year, will be erected at the company's works at Terni. The design will permit doubling its capacity. The plant will use propylene monomers derived from crude petroleum at Montecatini's plants near Ferrara.

Qualities of the fibres are said to include excellent resistance to pull, repeated bending, abrasion and chemical agents. They can be mixed with wool, cotton or silk.

West Germany Makes and Ships More Pharmaceuticals

In 1958, announces the Federal German Society of Chemical Industry from Frankfurt-on-Main, pharmaceutical products to the value of DM.1,850 million (about £154¼ million) were produced in West Germany, including West Berlin. This is DM.125 million worth (£10½ million worth) more than in 1957. Exports of pharmaceutical products by West Germany in 1958 were up by 5% on the 1957 figure. Total exports were worth DM.450 million (some £37½ million).

Imports of pharmaceutical products into West Germany over 1958 also increased by 5%, rising by DM.6 million (some £0.5 million) on the 1957 figure to DM.126 million (about £10.5 million). Switzerland increased her exports to West Germany over the year by 40%.

Natural Gas for Indonesian Fertiliser Plant

Plans to construct a urea fertiliser plant at Palembang, South-eastern Sumatra, have been carried a stage further with the signing of an agreement between the Indonesian Government and the Standard Vacuum Oil Co. for the supply of natural gas to the plant. The plant will be able to produce 100,000 tons of fertiliser a year.

Du Pont's Orlon Plant in Holland

Construction of E.I. Du Pont de Nemour's Orlon staple and tow factory at Dordrecht, Holland, is to begin in November. The Dutch subsidiary's name has been registered as Du Pont de Nemours (Nederland) N.V.

All technical design and building work will be carried out by Du Pont de Nemours (Nederland) N.V. in consultation with the Lummus company at the Hague. The major part of the building materials and installations for the factory will be bought in Holland, the rest in other European countries.

The new factory will have a production capacity of around 15 m. lb. of Orlon and is expected to be completed sometime in 1961.

Welding of Hostalen Polythene

HOSTALEN, linear low pressure polythene marketed by Farbwerke Hoechst A.G., was the subject of an evening conference in London recently. It was organised by Hoechst and illustrated (by films and a talk) development of Hostalen and preferred techniques in processing this material.

Semi-finished articles from Hostalen can easily be processed today by sawing, drilling, turning, planing, milling, etc. One method recommended by the company in particular is hot tool welding where the parts to be joined are heated on a plate at 200°C, and are then brought together under slight pressure. Improved processes have also been developed for hot-gas welding with filler rod, the resulting seams possessing strengths of 80-100% of that of the basic material. The welding processes are stated to result in considerable savings, particularly with regard to working time. A 50% saving may well be effected, it is claimed.

For high-grade tubes suitable for carrying drinking water and industrial water supplies Hostalen GM 5010 has been produced. Claims made for piping from this material are: corrosion-resistance; frost resistance; acid resistance; ease of laying piping; supply of great lengths of pipe; freedom from odour or taste; physiologically harmlessness; and resistance to ageing. Other advantages are: reduced cross-sectional areas or increased conveying capacity due to lower friction; no sedimentation; transport costs are low on account of the light weight of the material (sp. gr. 0.94). Tube coils of a length of 500 metres (nominal pressure 6) have been manufactured, having an outer diameter of 90 mm., an inner diameter of 79.8 mm., and a wall thickness of 5.1mm.

According to tests at Hoechst, at 20°C the stability of a tube of Hostalen GM 5010 in the circumferential direction should still be 65 kg./cm.^{2} after a life of 50 years.

Farbwerke Hoechst have recently issued an illustrated booklet on Hostalen which provides details of injection moulding of Hostalen and problems associated with injection moulding, the use of reprocessed Hostalen, compatibility with other polythenes, bonding and welding of injection moulded parts; metallising of injection moulded parts, etc. This booklet and additional information can be obtained from Hoechst Chemicals Ltd., 50 Jermyn Street, S.W.1.

PEOPLE in the news

● MR. W. K. HUTCHISON, C.B.E., who has been elected president of the Institution of Chemical Engineers, has been chairman of the South Eastern Gas Board since 1948 and is a former president of the Institution of Gas Engineers. He was educated at Edinburgh Academy and Corpus Christi College, Oxford, and joined the Gas Light and Coke Co. in 1926 as research chemist, later becoming managing director. During the war as Director of Compressed Gases he was responsible for all the hydrogen used in barrage ballons and oxygen used in high flying.

● MR. J. E. C. BAILEY, C.B.E., chairman and managing director of Baird and Tatlock (London) Ltd. and Hopkin and Williams Ltd., left the U.K. on 18 April for Canada and the U.S. While in America, he will address the Scientific Apparatus Makers of America at their annual conference at White Sulphur Springs, West Virginia. He will speak on the European Common Market, and how it will affect exports from non-member nations, including the U.S.

● MR. C. L. BOLT, science correspondent to European Services since 1952, has been appointed science correspondent of the B.B.C. News Division, based on Broadcasting House.

● DR. J. D. KENDALL (Ilford Ltd.) has been appointed chairman of the Fine Chemicals Group, S.C.I. The vice-chairmen are DR. B. A. HEMS and DR. A. C. C. NEWMAN; honorary treasurer, DR. R. E. BOWMAN; honorary recorder, DR. D. S. MORRIS and honorary secretary, DR. J. H. WILKINSON, reader in chemical pathology, Westminster Medical School.

● MR. PAUL M. GARNIER has been appointed general manager of Fred Ferraris (Clerkenwell) Ltd. in succession to Mr. Fred Wingfield. Mr. Garnier as a production engineer has worked for important clock and instrument firms.

● MR. MAURICE J. SMITH, overseas trade director, DR. A. WORLOCK, chief of medical information department, MR. G. T. RANDAL DAVIES, overseas marketing department, and MR. W. S. BURTENSHAW, Far East representative, this week attended a conference of Eastern representatives of Evans Medical Supplies Ltd. in the Taj Mahal Hotel, Bombay.

● MR. T. H. HOPPER, Ph.C., Middleton and Co. Ltd., was elected chairman of the British Laboratory Ware Association at the recent annual meeting. Other officers are: vice-chairman, A. TATMAN (Townson and Mercer Ltd.); honorary treasurer, H. B. TOFT (A. Gallenkamp and Co. Ltd.); immediate past-chairman, T. A. DRYDEN (T. Dryden Ltd.); members of council, A. G. P. POWELL (Baird and Tatlock); J. G. MALPASS (W. Finlayson); V. L. JONES (Philip Harris); J. S. TOWERS (J. W. Towers and Co.); J. CLEGG (James Woolley Sons and Co.); G. A. BENNIE (McCullock Brothers and Wilson); F. A. RENN (Griffin and George); secretary, W. H. ADAMS. MR. C. A. MERRY (Griffin and George) was re-elected convenor of the technical committee and MR. D. N. ALLAN (Townson and Mercer), MR. A. W. BARKLA (J. W. Towers), MR. S. J. KENNEDY (Baird and Tatlock) and MR. R. W. PARKER (A. Gallenkamp) were also re-elected.

● MR. C. W. SIMPSON has been appointed secretary and accountant of Keeton, Sons and Co. Ltd., a member of the Firth Cleveland Group, Keetona Works, Greenland Road, Sheffield 9, who specialise in the production of hollow bored bars, with special emphasis on deep boring for the chemical, petroleum and heavy machinery industries.

● Wilfrid Smith Ltd announce that MR. J. A. CLOVIS, after a number of years of service, has been appointed to the board.

● MR. R. M. COLLINS has resigned from the board of the Anglo-French Phosphate Co.

● Petbow Ltd., Sandwich, Kent, have appointed MR. K. GLENSEY and MR. I. D. COCKERELL as overseas technical sales representatives and MR. J. L. RUMMINS in a similar post based on London.

● On appointment to the board of the B.B. Chemical Co. Ltd. MR. G. W. J. REINHARDT, secretary and chief accountant, retains the position of secretary. MR. H. RUSSON succeeds him as chief accountant.

● MR. P. T. E. LAKE has been appointed technical sales representative in the north-east of England for Nordac Ltd., Uxbridge.

● MR. H. K. VOSS, technical director of Voss Instruments Ltd., Maldon, Essex, has just returned from a visit to their Continental agents. During his visit he appointed MR. WOLFGANG ZEH, Duisburg-Meiderich, agent for Western Germany for their laboratory and industrial stirrers.

● Members elected to serve on the Council of the Textile Institute for three years include DR. ERIC KANN, Ph.D., F.R.I.C. (Marks and Spencer Ltd.), MR. W. A. DUTTON, F.T.I. (deputy director of research, Hosiery and Allied Trades' Research Association) and DR. F. C. WOOD, Ph.D., F.R.I.C. (chief research chemist, Tootal Broadhurst Lee Co. Ltd.).

● PROFESSOR JOHN READ, F.R.S., Professor of Chemistry, St. Salvator's College, University of St. Andrews, has been chosen for the 1959 Dexter Award, administered by the division of history of chemistry of the American Chemical Society. This is the first time the Dexter Award has been conferred outside the U.S.

● MR. J. C. H. MCENTEE, chairman of the I.C.I. Wilton Council, is to succeed COLONEL J. PECKSTON, as president of the Tees-side and South-West Durham Chamber of Commerce.

Ernest-John Solvay, S.C.I. president-elect, is a frequent visitor to this country and attended a private dinner in London last week. He has been chairman of Solvay et Cie, Brussels, since 1947

● MR. L. SMITH, who has been appointed accountant of the Pyrethrum Board of Kenya, has taken up residence in Nakuru where the board has its headquarters. He was for some years in the research department of Imperial Chemical Industries Ltd.

● MR. J. C. MARSHALL, B.Sc., has been appointed to the newly created post of southern district manager, Chemicals Division, Union Carbide Ltd. Mr. Marshall will be responsible for all chemical marketing activities for the whole of the South of England, including South and West Midlands.

● DR. CECIL PEPPER, Ph.D., F.R.I.C., F.C.S., has been appointed managing director of Alexander Duckham and Co. Dr. Pepper joined the company in 1936 as a research chemist. In 1941 he became a director and, in addition to the responsibility for technical developments, has held the appointment of joint managing director since 1952.

● MR. D. C. BANKS and MAJOR D. A. BLAIR have been appointed directors of the Distillers Co. Ltd.

● MR. C. H. TANNER, a director of F. W. Berk and Co. Ltd., has been elected vice-chairman and MR. C. R. F. BERK becomes a managing director. MR. B. E. MILEHAM and MR. F. A. RIVETT have been appointed to the board.

● MR. R. L. BROWN, director of Basic Research Laboratories, was among five members of the staff of the British Coal Utilisation Research Association who have been with the association since its foundation 21 years ago and received gold watches at the recent open day. Lord Mills, Minister of Power, made the presentations.

Ministry Recommends Safety Measures For Fluoroacetamide

NOTES by the Ministry of Agriculture, Fisheries and Food, set out recommendations for the safe use of fluoroacetamide and phenylmercury salicylate aerosols in agriculture and horticulture.

Aqueous solutions containing *not more than* 1% active ingredient fluoroacetamide need not be included in the Agriculture (Poisonous Substances) Regulations. Precautions set out on the label of preparations should be observed carefully. These are: to avoid contact with the skin by the concentrate; if the skin is contaminated, it should be washed immediately with soap and water. Hands should be washed after using fluoroacetamide preparations and before eating, drinking or smoking.

When fluoroacetamide is formulated at a strength greater than 1% active ingredient, it is included in the Agriculture (Poisonous Substances) Regulations as a Second Schedule Part II substance.

Use of fluoroacetamide at any time on non-edible plants is acceptable. With regard to brussels sprouts and other crops, provided not more than two applications, totalling 6 oz. of the active ingredient per acre, are made, the last one not less than five weeks before harvesting for brussels sprouts and four weeks for other crops (cabbages, red cabbage, savoys, sprouting broccoli, kale and spring onions), use of fluoroacetamide will not lead to a consumer hazard.

There is insufficient evidence, as yet, on which to base recommendations for use of this compound on other edible crops including cauliflower, livestock and poultry, etc.

Organo-mercury Aerosols

Organo-mercury aerosols, it is recommended, should continue to be included in the Agriculture (Poisonous Substances) Regulations. Use of phenylmercury salicylate aerosols at any time on a non-edible crop is acceptable but it may only be applied, under certain conditions, to tomatoes grown under glass. These conditions are that not more than five applications may be made at intervals of not less than seven days. Dosage of each application should not exceed 40 mg. organically combined mercury per 1,000 cu. ft. of glasshouse space (e.g. 1 fl. oz. of a formulation containing 0.3% by weight organically combined mercury per 1,700 cu. ft.). Under such conditions the residue should not exceed 0.1 p.p.m. mercury.

The recommendations made in respect of these two chemical compounds are provisional for 1959 only and are to be reviewed at the end of the season.

Morphothion

A Ministry of Agriculture recommendation says that morphothion need not be included in the Agriculture (Poisonous Substances) regulations. Its use should not present a hazard to operators, provided they observe the following precautions, which distributors are requested to include on their labels:

Wear rubber gloves and face shield. If skin contaminated wash immediately with soap and water. If eyes contaminated wash out immediately. Avoid contact with spray mist. Wash exposed parts of body before eating, drinking or smoking and after spraying.

These precautions are particularly important if an operator has been using toxic organo-phosphorus compounds such as parathion, schradan, demeton and 'Phosdrin', as harmful additive effects may arise.

Provided the last application is made at least three weeks before harvesting morphothion used on hops ought to present no hazard to consumers. There is not sufficient evidence for recommendations concerning other edible crops.

Equipment Credit Company for C.B.M.P.E.

BRITISH Oil equipment credits Ltd., a subsidiary company of the Council of British Manufacturers of Petroleum Equipment, has been registered. It has been formed to promote schemes for the sale on deferred terms to overseas purchasers of capital plant and equipment made in the United Kingdom for the petroleum industry.

Chairman of the new company is Mr. E. F. E. Howard of Hayward Tyler and Co. Ltd., the managing director is Mr. G. V. Sims, director of the council, and Miss D. B. Jaques is company secretary. The address is that of the council at 2 Princes Row, Buckingham Palace Road, London S.W.1.

The new company will shortly endeavour to arrange deferred terms for the supply of British-made equipment for an extension to the Minatitlan Refinery in Mexico, and Mr. Sims has left for Mexico.

Fluorinated Hydrocarbons of Increasing Importance Says Prof. Stacey

APPLICATIONS of polytetrafluoroethylene and the Freons, and the biological effects of fluorinated organic compounds were topics of increasing importance and interest. This was stated by Professor M. Stacey, Mason Professor of Chemistry and Head of Chemistry Department, University of Birmingham, at a joint meeting of the London Section Royal Institute of Chemistry, with the Kingston Technical College Chemical Society.

The older methods of fluorination, though still employed, were becoming overshadowed the Professor reported by the use of elementary fluorine itself, where the violence of the reaction could be moderated by the presence of an inert diluent gas or a solid catalyst, as CoF_3. Some of the most interesting results in this field lay in the fluorination of benzene. A solid product was obtained from which over 20 constituents had been isolated (including geometrical isomers) by vapour-phase chromatography. Both addition and replacement occurred. Among the products were several partially fluorinated *cyclo*-hexanes, and these could be dehydrofluorinated by alkali to cyclic olefins capable of polymerisation and oxidation to dicarboxylic acids. Cyclic dienes obtained from the $C_6F_{10}H_2$ isomers could be copolymerised with conventional olefins to products that were both fire-proof and water-proof. Sulphonation of these had opened up routes to new detergents of exceptional chemical stability.

Other products from the fluorination of benzene included purely aromatic types, such as C_6F_5H. This substance, by means of the Grignard reaction, provided a means of introducing the group C_6F_5- into molecules; it also opened up the entertaining prospect of studies on the directive influence of a hydrogen atom in a benzene ring!

Direct production of hexafluoro-benzene had long been a difficulty, but Professor Stacey said that recent work at Birmingham University had shown that it might be obtained by fluorinating benzene completely (to C_6F_{12}), and treating this product with nickel at high temperature, when six fluorine atoms were removed. By the action on C_6F_{16} of liquid ammonia the amino group NH_2- could be introduced, and thus, *via* the diazo-reaction, another route was opened up to C_6F_5—derivatives. Among these was the very strong acid C_6F_5OH.

The astonishing potentialities of this subject formed the conclusion of Professor Stacey's lecture. With the availability of many fluorine compounds hitherto unknown or rare there arose a multiplicity of topics for research the professor indicated. In the field of medicine fluorinated analogues of familiar materials were awaiting test and exploitation. American work on fluoro-silicones had shown many promising prospects for oil-resistant elastomers. Chlorofluoro-olefins polymerised to non-inflammable foam-rubbers, and the day would come when fluorine torches would be played upon objects with the express purpose of conferring on them the property of fire-resistance! Despite all the progress already made, however, the fields for new work seemed as vast as ever, and those engaged on this topic were confronted with the refreshing problem of which of the many new avenues to explore next.

Lower Outputs of Tar and Benzole

Outputs of crude tar and crude benzole by the gas industry in the nine months ended December 1958 were down on the corresponding period of 1957.

Crude tar output was 1,311,000 tons, compared with 1,356,000 tons, and crude benzole 17.8 million gall. compared with 19.7 million gall.

TRADE NOTES

Esso's Chemical Department

As from 2 May, the Chemicals Department of the Esso Petroleum Co. Ltd. will be located at 50 Stratton Street, London W.1 (Hyde Park 7030, Telex 21221).

TV For Nuclear Research

The activities of the remote handling division of Savage and Parsons Ltd., Watford, Herts, are being extended to cover the supply of closed circuit industrial television equipment to nuclear research and experimental establishments throughout the world.

This is the main effect of an agreement between Savage and Parsons Ltd. and Marconi's Wireless Telegraph Co. Ltd., Chelmsford, Essex.

Aluminium-Faced Asbestos Cloth

Turner Brothers Asbestos Co. Ltd., Rochdale, Lancs., have announced an addition to their range of woven asbestos cloths, among which several qualities are now available having a coating of highly reflective aluminium. They are of interest to industries concerned with thermal insulation problems.

New Fungicides

M.C.O.Z. dispersible powder, produced by F. W. Berk and Co. Ltd., Berk House, P.O. Box 500, Portman Square, London W.1, is a finely divided powder fungicide for the control of potato blight. The active ingredients are micronised zinc ethylene bisdithiocarbamate, equivalent to 35% zineb, micronised copper oxychloride, equivalent to 25% copper, and micronised phenyl mercury chloride equivalent to 0.3% mercury.

Cotton dust, for the control of insects affecting cotton, has as its active ingredients 40% sulphur, 10% D.D.T. and 3% gamma B.H.C.

Information about these fungicides is given in two pages for addition to the Berk Ring Book.

Siemens-Ediswan, Birmingham

On 1 May the Birmingham service depot of Siemens Edison Swan Ltd. moved from Henstead Street to new premises at 76-80, Sherlock Street, Birmingham 5, tel. Midland 0072.

On 1 June the Birmingham district office of Siemens Edison Swan Ltd. will have a new telephone number, Midland 8391 (five lines).

Short and Mason Representative

Short and Mason Ltd. state that Mr. William K. Gregson, 32 Park Road, Sale, Cheshire, has joined them as northern area representative. This supersedes their previous announcement that they were opening an office in Manchester.

Oil Resistant Industrial Gloves

A new range of industrial gloves specially designed for use in contact with oils and solvents has just been introduced by the Dunlop Rubber Co. Ltd., Cambridge Street, Manchester. Made with Hycar (British Geon's) synthetic rubber, these gloves are unaffected by oils, petrol, animal and vegetable fats, alcohols and many common solvents. They are stated to have a longer life, not to harden in use and to be completely impermeable to fluids.

East Anglian Representative

Londex Ltd. have appointed Harold Hubbard Ltd., 2 Aylsham Road, Norwich, Tel. 25941, technical representative for the counties of Norfolk and Suffolk.

R. and D. Division Expanded

The Research and Development Division of Baird and Tatlock (London) Ltd., Freshwater Road, Chadwell Heath, Essex, has recently been doubled in size to keep pace with increasing demand both for Analmatic equipment for automation in analysis and for new and redesigned standard laboratory instruments and apparatus. To deal with these two aspects of the work of the division two main sections have been formed—Analmatic instruments and general instruments. The division, consisting of these two sections, will continue to operate under the direction of Sir Bernard Keen, F.R.S.

Variable Flow Indicators

Walker, Crosweller and Co. Ltd., Cheltenham, have extended the range of their Arkon variable flow indicators. They can be adjusted for high or low velocities and now include sizes 1¼ in., 1½ in. and 2 in., in addition to ½ in., ¾ in. and 1 in.

Commercial News

British Petroleum

Expansion in the British Petroleum Co.'s manufacture of petroleum chemicals continued both as to scale of production and variety of materials manufactured, Sir Neville Gass, B.P.'s chairman, states in his annual report. As a result of steadily expanding manufacture of chemicals from petroleum, however, competition, he reports, is becoming severe.

All the companies in which B.P. participates—British Hydrocarbon Chemicals Ltd., Forth Chemicals Ltd., and Grange Chemicals Ltd.—had a successful year. In the last quarter of 1958 demand showed a definite upturn. In the case of certain products, prices have been reduced. Sales of chemicals during that period were at the rate of 195,000 tons per annum.

Rigidex plant is now being commissioned. Plants to make phenol and acetone are due to be in operation 'later this year'.

In France, Naphtachimie SA in which Soc. Francaise des Pétroles B.P. have a substantial holding, increased their production of ethylene and ethylene oxide considerably and a new plant for the manufacture of polythene by the Ziegler processs has been commissioned.

Edwards High Vacuum

Edwards High Vacuum Ltd. are paying 16% against 15%, with a final of 12%. Group profit increased from £179,636 to £224,035. After £116,767 (£103,178) taxation net profit is £106,058 (£76,145).

Hickson and Welch

Hickson and Welch (Holdings) Ltd., have declared a 4% interim dividend on capital increased by a three-for-seven scrip issue (same on smaller capital).

Permutit Co. Ltd.

Dividend of 15% for the year 1958 (same) is being paid by Permutit Co. Ltd. Net profit after tax, etc., is £168,988 (£210,945). Profits of subsidiaries after depreciation and overseas tax total £61,041 (£96,042).

Manchester Oil Refinery

Group trading profits of Manchester Oil Refinery (Holdings) Ltd. show a sharp contraction from £439,000 to £223,000 in 1958. After tax and depreciation there is a net loss of £18,000 compared with a previous profit of £112,000.

No dividend is recommended on the £390,000 ordinary, against 12½% previously. The board states, however, that the group's trading results for the first quarter of 1959 are encouraging and an interim dividend will be considered in the autumn.

Newton Chambers

Signs of increased U.K. industrial activity and a marked improvement in the number of export inquiries received are noted by Sir Peter Roberts, chairman of Newton Chambers and Co. Ltd. in the company's annual report. It is expected to be some time, however, before the Budget's financial stimulus is reflected in additional work on the shop floor.

Profit for 1958 of the parent company amounted to £922,130 (£1,037,805). Group capital expenditure during 1958 totalled £711,000 and at the year end, the group was committed to further expenditure of £259,775. It is planned to spend some £600,000 this year.

Newton Chambers are repeating the 16% dividend (same) for the year on an increased capital.

• Steady Expansion in B.P. Petrochemicals
• Manchester Oil Profits were Halved
• Newton Chambers Fix Spending at £600,000
• Reichhold Inc. Expect Sales to Treble

J. R. Geigy AG

Net profit of J. R. Geigy AG, Basle, for 1958 was Fr.9.5 million (£791,670) compared with Fr.9,020,000 (£751,670). Dividend remains at 21%.

Reichhold Chemie AG

Reichhold Chemie AG, Hamburg, have raised their dividend from 11% to 14%. Capital is to be increased from DM.4 million (£334,000 to DM.5 million (£417,000). Investment in 1957 and 1958 totalled DM.4 million; the same amount is to be spent this year.

Mr. Henry H. Reichhold, president of Reichhold Chemicals Inc., stated in Hamburg that the group's world turnover in 1958 was $150 million, a figure that would be trebled in five years. Germany's turnover last year was DM.30 million (£2.5 million), about 5% of the world total. U.S. turnover was $74,060,000 ($66,320,000); net profit was $3,350,000 ($2,930,00).

Soc. Monte Amiata

The depressed position of the Italian mercury industry, now virtually unable to sell its products owing to tax impositions, is shown by the report of the leading producers, Societa Monte Amiata. The company reports a loss in 1958 of Lire 170 million, against a net profit of Lire 312.6 million.

INCREASE OF CAPITAL

K. W. CHEMICALS LTD., 55-57 High Holborn, London W.C.1. Increased to: nominal £50,000, fully paid-up £25,000.

LONDON GAZETTE

Voluntary Winding-up

Notice of a company voluntarily winding-up does not imply liabilities, it is purely formal and frequently is for purposes of internal reconstruction.

PEARSON'S HYCOL LTD., manufacturers of disinfectants, reg. off.: 63-64 New Broad Street, London E.C.2. Mr. R. W. Metcalf, 63-64 New Broad Street, London E.C.2, appointed liquidator, 7 April, by members.

Market Reports

BUSINESS STARTS BRISKLY IN SCOTLAND

LONDON Conditions on the industrial chemicals market during the past week have been fairly active with a moderate flow of new enquiry for home and export account.

The routine potash and soda products have been moving well against contracts and there has been a steady call for supplies of hydrogen peroxide, sulphate of alumina and the barium compounds at unchanged rates. Zinc oxide is dearer, the red seal now being quoted at £94 per ton for 2-ton lots. Elsewhere prices are steady at recent levels.

Among the coal tar products, pitch, refined tar and creosote oil are finding a good outlet, whilst cresylic acid is moving well. No price changes have been reported.

MANCHESTER The volume of enquiry from home consumers of heavy chemical products on the Manchester market during the past week has been on a somewhat better scale and, on the whole, traders have had relatively little ground for complaint regarding the rate at which contracts for the soda products and other leading lines are being drawn against. In the aggregate export business seems to have been maintained, though there has recently been a decline in the takings of a number of individual markets. The fertiliser section is now showing signs of reduced activity.

GLASGOW Business during the past week in the Scottish heavy chemical market opened quite briskly, but the level rather moderated towards the end. Although demands from certain sections of the industry are keeping fairly steady, others are still encountering a slight recession, owing to trade conditions from which it is hoped some improvement will be forthcoming. There has been little change in prices, which are mostly remaining firm. The activity reported in regard to agricultural chemicals is still being maintained, both in regard to enquiries and demands.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

On sale 10 June

Monazite. Soc. De Produits Chimiques Des Terres Rares. **674 400**

Purifying hydrocarbons. Standard Oil Development Co. **700 551**

ACCEPTANCES

Open to public inspection 10 June

Removal of oxygen from aqueous solution. Permutit Co. Ltd. **814 795**

Therapeutically useful cysteine compound, and a process for the production thereof. Nordmark Werke G.m.b.H. **814 586**

Unsaturated diesters of isopropylidene ois (phenyleneoxy) diethanols. U.S. Rubber Co. **814 705**

Dithiophosphate ester and insecticidal compositions comprising it. Sandoz Ltd. **814 587**

Low temperature carbonylation. Esso Research & Engineering Co. **814 706**

Production of gases containing sulphur dioxide and of solid roasted products free from arsenic and antimony by fluidised layer roasting of materials containing roastable sulphur in addition to arsenic and/or antimony. Badische Anilin- & Soda-Fabrik A.G. **814 707**

Preparation of methyl magnesium compounds from dimethyl sulphate. Soc. Des Usines Chimiques Rhone-Poulenc. **814 708**

Explosive composition. Du Pont de Nemours & Co., E. I. **814 590**

Manufacture of polyhydrophenanthrene compounds. Ciba Ltd. [Divided out of 814 711.] **814 712**

Open to public inspection 17 June

Method of ore treatment. Hoffman, J. I. **815 081**

Vapour vacuum pumps. Edwards & Co. (London) Ltd., W. **815 051**

Polyester resin compositions. British Industrial Plastics Ltd. **815 084**

Water repellent finishes. Bradford Dyers' Assoc. Ltd. [Addition to 708 821.] **814 899**

Apparatus using a radioactive material and an ionisation chamber. Cole Ltd., E. K., and Davis, R. G. **814 890**

Chlorinated polyethylene. Petrochemicals Ltd. **815 086**

Device for conveying materials of a pulverulent or granular nature. Redler Conveyors Ltd. **815 064**

Methol and apparatus for treating nylon and polyester fibre cords. General Tire & Rubber Co. **815 065**

Production of halogenated hydrocarbons. Phillips Petroleum Co. **815 088**

Plant growth influencing compositions. Geigy A.G., J. R. **814 947**

Separation of alcohols. Imperial Chemical Industries Ltd. **815 091**

Densimetric separation of solid materials. Preparation Industrielle des Combustibles. **814 960**

Recovery of heavy hydrogen and heavy water. Stamicarbon N.V. **815 098**

Apparatus for effecting glow combustion at high temperature. Wagner, H. **815 100**

Aromatic acid amides of aminoalkyl vinyl ethers and their polymers. Rohm & Haas Co. **815 103**

Steroid compounds and the preparation thereof. Pfizer & Co. Inc., C. **814 877**

Resinous compositions. Midland Silicones Ltd. **815 107**

Cyclodiene dimerising process. Esso Research & Engineering Co. **815 151**

Ultrasonic flow detecting apparatus. Glass Developments Ltd. **815 071**

Electrodialysis processes. Permutit Co. Ltd. **815 154**

Cracking heavy hydrocarbon oils by means of a fluidised bed of hot inert-solid particles. Esso Research & Engineering Co. **815 155**

Manufacture of hard metal carbide products. Titanium Products Corp. Ltd. **814 977**

Cooling of fluids. British Thomson-Houston Co. Ltd. **815 114**

Production of artificial filaments, yarns or threads. Courtaulds Ltd. **815 157**

Organotitanium compounds. National Lead Co. **815 159**

Manufacture of thiophosphoric acid esters. Farbenfabriken Bayer A.G. **815 160**

Polymerisation process. Koppers Co. Inc. **815 161**

Production of alcohols and ketones by the oxidation of cycloaliphatic or araliphatic hydrocarbons. Badische Anilin- & Soda-Fabrik A.G. **815 162**

Refining of metals by zone melting. U.K. Atomic Energy Authority. **815 074**

Manufacture of acrylic acids or esters. Soc. d'Electro-Chimie, d'Electro-Metallurgie et des Acieries Electriques d'Ugine. **815 163**

Curable polyurethane and polyurethane-polyrea polymers. Du Pont de Nemours & Co., E. I. **815 122**

Production of aluminium by fused salt electrolysis. Montecatini Soc. Generale per l'Industria Mineraria e Chimica, and Varda, G. de. **815 076**

Emulsifiable toxicant compositions and emulsifying agents suitable therefor. Emulsol Chemical Corp. **815 001**

Radiation-sensitive diazotype materials. Ilford Ltd. [Cognate application 21 027.] **815 005**

Elastically extensible structures. Soc. Applicazioni Gomma Antivibranti S.A.G.A. S.p.a. **815 130**

Means of feeding liquids to rollers. Timson, E. A. **815 131**

Process and apparatus for the concentration of solutions. Schneider, C. **815 009**

Revaporising liquefied gases. Constock Liquid Methane Corp. **815 012**

N-alkyl taurines. Imperial Chemical Industries Ltd. **815 167**

Polymeric Products. Du Pont de Nemours & Co., E. I. **815 168**

Sensitising dyes for photographic silver halide emulsions. Gevaert Photo-Producten N.V. [Divided out of 812 924.] **815 172**

Method for moulding expandable thermoplastic resinous materials and moulded articles thereby obtained. Dow Chemical Co. **815 173**

Polyesters and condensation products thereof with aminoplasts. Rohm & Haas Co. **815 179**

Apparatus for the continuous reaction of solid substances Henkel & C'e G.m.b.H. **815 180**

Plant for continuous operation of at least two hermetically closed centrifugal separators working in series. Separator A.B. **815 029**

Purification of silver hyponitrile. Imperial Chemical Industries Ltd. **815 183**

Treatment of leather. Imperial Chemical Industries Ltd **815 185**

Thiadiazoles. Lepetit S.p.a. **815 188**

Production of threads and films from cuprammonium cellulose solution. Bemberg, A.G., J. P. **815 189**

Method of combining reinforcing fibres and liquid binding agents to produce pre-determined shapes. Jones, A. **815 036**

DIARY DATES

MONDAY 4 MAY

S.C.I.—London: 14 Belgrave Sq., S.W.1., 6 p.m. London section A.g.m. Followed by 'The conveyor concept of water in industry', by Mr. E. L. Streatfield.

TUESDAY 5 MAY

S.C.I.—London: 14 Belgrave Sq., S.W.1., 6.30 p.m. Plastics and polymer group A.g.m. Followed by 'The pursuit of polymers', by Mr. C. E Hollis.

WEDNESDAY 6 MAY

S.A.C.—London: Burlington House, W.1, 7 p.m. 'The fundamental principles of modern experiment design', by Dr. E. C. Wood; 'Statistics in standardising chemical methods', by Mr. W. C. Wake.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.30 p.m. Corrosion group A.g.m., followed by 'Corrosion as a design problem', by Dr. S. G. Clarke.

Soc. for Visiting Scientists—London: 5 Old Burlington St., W.1, 7.30 p.m. Discussion meeting, 'As others see us'.

THURSDAY 7 MAY

C.S.—London: Burlington House, W.1, 7.30 p.m. 'Recent developments in the chemistry of the ipecacuanha alkaloids', by A. R. Battersby, R. Binks, G. C. Davidson, B. J. T. Harper and S. Garratt. 'Aldol-, pinacol- and benzoin-type reactions of Δ¹- pyrroline 1—oxides', by R. F. C. Brown, V. M. Clark, M. Lamchen, B. Sklarz and Sir Alexander Todd. 'Perpendicular conjugation in some octahedral metallophthalocyanine derivatives', by J. A. Elridge and A. B. P. Lever.

S.C.I.—Epsom: Central Research Dept., the Distillers Co. Ltd., 2 p.m. Visit of Microbiology Group.

FRIDAY 8 MAY

S.A.C. with R.I.C.—Swansea: 'Rock and mineral analysis and geochemical prospecting'.

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